5 COMMENTS AND RESPONSES

A. Introduction

This chapter includes a reproduction of, and responses to, each letter received during the public review period. Each letter is reproduced in its entirety, in the same order listed in Chapter 4 of this Final EIR. Letters are grouped by category as follows:

- ♦ Local Agencies
- ♦ Non-Governmental Organizations
- ♦ Members of the Public

Within each category, letters are arranged in chronological order by the date sent. Each comment and response is labeled with a reference number in the margin.

In addition, the chapter includes responses to comments received at the public hearing on the Draft EIR, which was held on February 25, 2010. An official transcript of the public hearing is reproduced following the public comment letters.

Two master responses have been prepared to allow for a more detailed response to issues of particular concern to the public. Master Response 1 addresses the Geological Conditions Underlying the LBNL Main Hill Site. Master Response 2 addresses Security Issues. Responses in the response matrix direct the reader to the master responses as appropriate. The master responses are included after the transcript of the public hearing, ahead of the response to comment matrix in this chapter.

Responses to letters and public comments are presented in a matrix, following the master responses. The reference number and text of the comments are presented alongside the response for ease of reference. Where the same comment has been made more than once, a response may direct the reader to another numbered comment and response. Where a response requires revisions to the Draft EIR, these revisions are explained and shown in Chapter 3 of this Final EIR document.

B. Public Comments

Comment letters received during the public review period are reproduced below, together with a transcript of the public hearing held on February 25, 2010.

COMMENT LETTER EBMUD

EAST BAY
MUNICIPAL UTILITY DISTRICT

March 10, 2010

Jeff Philliber, Environmental Planner
Lawrence Berkeley National Laboratory
Environmental Planning Group
One Cyclotron Road, MS 76-234A
Berkeley, CA 94720

EBMUD-1

Re: Notice of Availability of a Draft Environmental Impact Report – Seismic Phase 2 Project, Lawrence Berkeley National Laboratory

Dear Mr. Philliber:

East Bay Municipal Utility District (EBMUD) appreciates the opportunity to comment on the Draft Environmental Impact Report (EIR) for the Seismic Phase 2 Project located at the Lawrence Berkeley National Laboratory (LBNL) in the Oakland-Berkeley Hills area. EBMUD has the following comments.

GENERAL

On page 4.13-11, first paragraph under 4. Domestic and Fire Water Supply, EBMUD's Berkeley View Reservoir capacity should be revised to 1 million gallon. EBMUD-2

On page 4.13-11, first paragraph under 4. Domestic and Fire Water Supply, please provide a reference on how the 5,000 gallons per minute flow capacity was determined. EBMUD-3

WATER SERVICE

EBMUD-4

EBMUD's Shasta and Berkeley View pressure zones currently serve the existing LBNL facilities. If additional water service is needed, the project sponsor should contact EBMUD's New Business Office and request a water service estimate to determine costs and conditions for providing additional water service to the existing parcels. Engineering and installation of water services requires substantial lead-time, which should be provided for in the project sponsor's development schedule.

WASTEWATER PLANNING

EBMUD-5

Please be aware that several regulatory changes have taken place since EBMUD provided comments to the Notice of Preparation of the EIR for the project.

EBMUD's Main Wastewater Treatment Plant (MWWTP) and interceptor system are anticipated to have adequate dry weather capacity to treat the proposed wastewater flows from this project, provided that the project and the wastewater generated by the project meet the requirements of the current EBMUD Wastewater Control Ordinance. However, wet weather flows are a concern. EBMUD has historically operated three Wet Weather Facilities to provide treatment for high wet weather flows that exceed the treatment capacity of the MWWTP. On January 14, 2009, due to Environmental Protection Agency's (EPA) and the State Water Resources Control Board's (SWRCB) re-interpretation of applicable law, the Regional Water Quality Control Board (RWQCB) issued an order prohibiting further discharges from EBMUD's Wet Weather Facilities. Additionally, on July 22, 2009 a Stipulated Order for Preliminary Relief issued by EPA, the SWRCB, and RWQCB became effective. This order requires EBMUD to begin work that will identify problem infiltration/inflow areas, begin to reduce infiltration/inflow through private sewer lateral improvements, and lay the groundwork for future efforts to eliminate discharges from the Wet Weather Facilities.

Currently, there is insufficient information to forecast how these changes will impact allowable wet weather flows in the individual collection system subbasins contributing to the EBMUD wastewater system, including the subbasin in which the proposed project is located. As required by the Stipulated Order, EBMUD is conducting extensive flow monitoring and hydraulic modeling to determine the level of flow reductions that will be needed in order to comply with the new zero-discharge requirement at the Wet Weather Facilities. It is reasonable to assume that a new regional wet weather flow allocation process may occur in the East Bay, but the schedule for implementation of any new flow allocations has not yet been determined. In the meantime, it would be prudent for the lead agency to require the project applicant to incorporate the following measures into the proposed project: (1) replace or rehabilitate any existing sanitary sewer collection systems, including sewer lateral lines, to reduce infiltration/inflow and (2) ensure any new wastewater collection systems, including sewer lateral lines, for the project are constructed to prevent infiltration/inflow to the maximum extent feasible. Please include such provisions in the environmental documentation and other appropriate approvals for this project.

EBMUD-5 cont.

If you have any questions concerning this response, please contact David J. Rehnstrom, Senior Civil Engineer, Water Service Planning at (510) 287-1365.

Sincerely,

W.R. [signature]

William R. Kirkpatrick
Manager of Water Distribution Planning

WRK:AMW:sb
sb10_045.doc

Committee to Minimize Toxic Waste

March 14, 2010

Jeff Philliber, UC-LBNL Environmental Planner
Lawrence Berkeley National Laboratory
One Cyclotron Road, MS 76-234A
Berkeley, California 94720

Subject: Comments on the Draft Environmental Impact Report (DEIR) for Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2 Project at the Lawrence Berkeley National Laboratory (LBNL)

Dear Mr. Philliber,

The above referenced Project consists of the demolition of Buildings 25, 25B and 55, six modular trailers associated with Building 71, the construction of an approximately 43,000 gross square foot General Purpose Laboratory (GPL), and the seismic strengthening of the Building 85 complex – LBNL's Hazardous Waste Handling, Treatment and Storage Facility, all located in the Strawberry Creek Watershed's Strawberry and Blackberry Canyons. CMTW-1

Our comments are provided in two (2) parts. Since all the project components (areas associated with B85 complex, B25 and B71) are located site- wide at LBNL, in areas of great concern to the community, i.e. on top of earthquake faults, active landslides, radioactive and chemical contamination plumes (both soil and groundwater), creeks and networks of creeks etc., **Part 1** of our comment letter is titled: **Contaminant Plumes of the Lawrence Berkeley National Laboratory and their Interrelation to Faults, Landslides, and Streams in Strawberry Canyon, Berkeley and Oakland, California,** and cover our concerns in the following areas evaluated in the DEIR: Biological Resources, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Transportation and Traffic, Utilities and Service Systems – and we ask that you respond to our concerns in a comprehensive and serious manner.

Part 2 of our comment letter on DEIR consists of all the comments we provided on the Notice of Preparation (NOP) of the above referenced document, as these comments and concerns were largely ignored in the preparation of DEIR .The only changes that occurred between the NOP and the NOA (Notice of Availability) of the DEIR related to the demolition of several buildings and structures in the Old Town area, i.e. Buildings 4, 5, 14, 16, and 17, possibly some of the most contaminated buildings at LBNL, and Building 74F in the East Canyon, which were all removed from the EIR process, escaped all public and agency comment as they were secretly included into the Old Town CMTW-2

Demolition project, for which a Categorical Exclusion under NEPA was filed in December 2009, without any notice to the public. Please, explain why? We also ask that a full blown EIS under NEPA be prepared for the Old Town Demolition project.

CMTW-2 cont.
CMTW-3

Every single structure evaluated in the DEIR is located in a landslide area, as officially defined by the State of California, as being in an Earthquake Induced Landslide Hazard Zone, i.e. landslides will be mobilized in the event of a major earthquake – expected to happen any day now on the active Hayward Fault! (See attachment 1). Furthermore all the components of this Project are located in areas of LBNL where legacy chemical and radioactive contamination is present in the soil and groundwater, due to operations during the last 70 years, which the DEIR failed to describe in the kind of detail that the site and its history warrants! The DEIR is deficient, inadequate, misleading and in sections erroneous. For instance a claim is made that the new proposed location of the GPL is not located in Strawberry Canyon, when indeed Figure 4.8-1 of the DEIR shows the Strawberry Creek Watershed divisions into Blackberry Canyon and Strawberry Canyon, indicating clearly that the entire Building 25 site, the proposed location of the GPL, is in Strawberry Canyon, in the middle of the Building 25 slide and Building 25A Lobe of the Old Town Groundwater Solvent (VOC) Plume! (See attachment 2, A and B)

CMTW-4
CMTW-5
CMTW-6

In conclusion, LBNL, UC and the Department of Energy (DOE) continue to willfully ignore and exclude the most significant, fundamental facts related to the Lab site, i.e. the unconsolidated nature of the volcanic rocks, mud and water that fill an old crater, a collapsed caldera, on which LBNL facilities were built starting in 1940! What is the use of drilling 35-50 foot deep holes for piers into this unconsolidated mélange of volcanic fragmental debris, without **ever** reaching bedrock, to attempt to tieback the Lab's Hazardous and Radioactive Waste Treatment and Storage Facility (B85 complex), further wasting taxpayer funds! The landslide on which the Hazardous Waste Handling Facility (HWHF) was built is over 2200 feet (7+ football fields) long, between the East Canyon Fault (with its numerous springs already identified by UC in 1875) and the Wildcat Fault.(See attachment 3, A and B).

CMTW-7
CMTW-8
CMTW-9

The same danger is present at the B71 and B25 sites, as both are on top of active landslides (See attachment 1). We therefore ask that LBNL/DOE/UC immediately issue a site-wide **MORATORIUM** to any new construction and immediately assemble an international, world-class, independent group of geotechnical experts to perform all-encompassing, site-wide geological investigations and excavations regarding faulting, geology and landslides in the Strawberry and Blackberry Canyons, and that these experts be paid by some of the $ 264 million of ARRA (American Recovery and Reinvestment Act) funds, already received by LBNL! (See attachment 4, A and B)

CMTW-10
CMTW-11

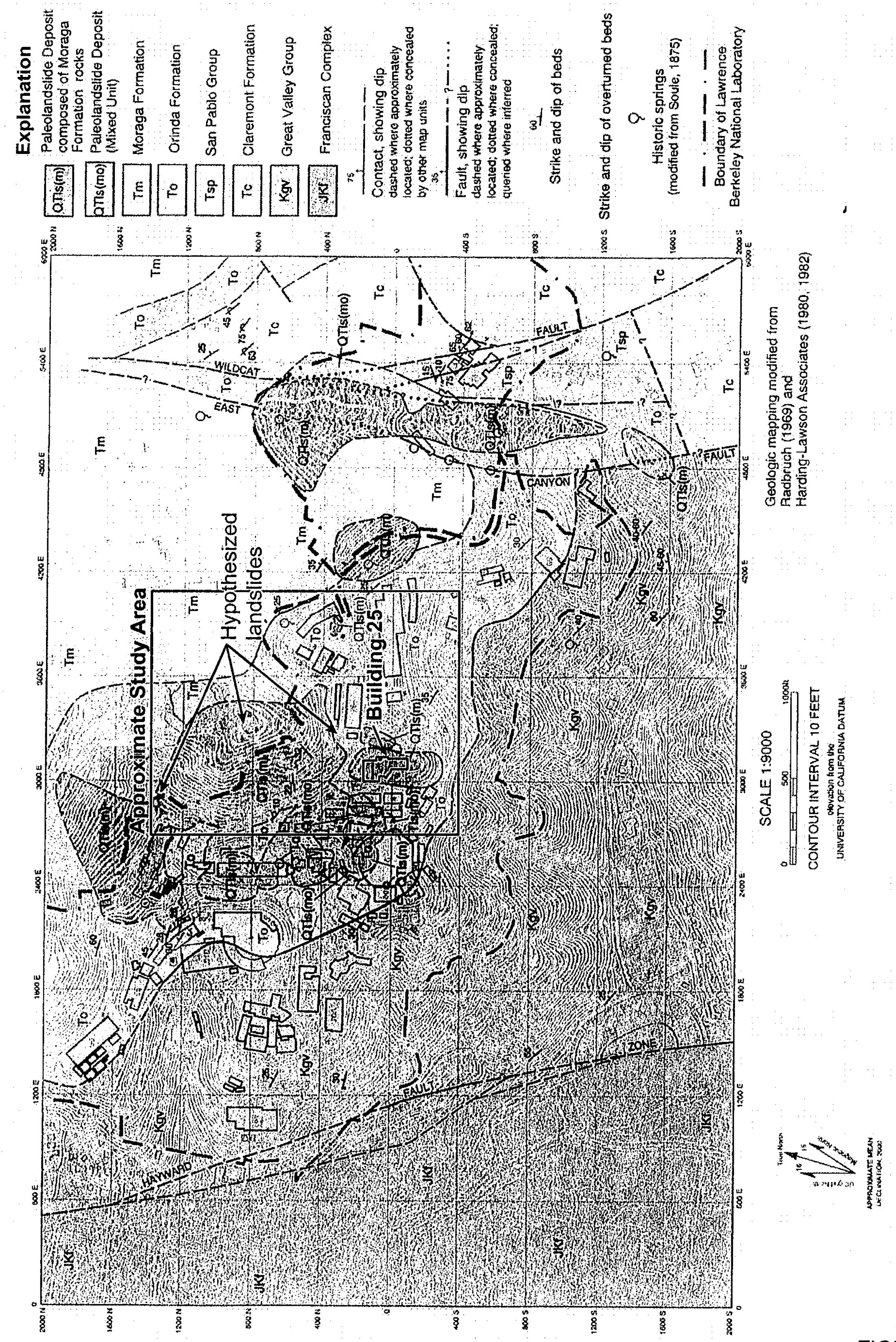
We also ask that at the same time, during the moratorium, a comprehensive Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) be prepared for this Project!

CMTW-12

ATTACHMENT 1.

Fugro WLA
Project No. 2072.001 LBNL Building 25

FUGRO



LBNL GEOLOGIC MAP FROM THE RFI (PARSONS, 2000) REPORT

CMTW-13

FIGURE 3

Graphics, Active Projects, 2072.001, Modified 08.31.09

3.

ATTACHMENT 1A

JANUARY 28-FEBRUARY 3, 2010

THE BERKELEY DAILY PLANET

Volume 11, Issue 43 DAILY ONLINE, WEEKLY IN PRINT $2 Donation Requested

4/83

4.

The Volcano Beneath

By GEORGIA WRIGHT

Most people do not know that the Lawrence Berkeley National Laboratory is almost entirely sited on a caldeara, a collapsed volcano. Below this caldera there is the Hayward Fault, which cuts through Memorial Stadium and across the bottom of the hills. The Hayward Fault is due for a magnitude 6.5 to 7.0 earthquake anytime within the next 30 years. Still, LBNL plans to build up to a million square feet of research facilities on its steep and unstable hills above the city and UC campus.

The Save Strawberry Canyon organization has successfully challenged the lab's building plans in court on both the state and federal level, but remains concerned that three new construction projects are now planned for the Blackberry Canyon area, within the caldera, including the BELLA laser accelerator. In addition, the controversial Computational Research and Theory facility (CRT) is planned to be built below the edge of the caldera, marked by the Cyclotron.

A new YouTube video explains the caldera phenomena. It makes a strong case for preventing any new construction on the LBNL sites within both the Blackberry and Strawberry canyons. Such buildings would be unstable and could further endanger the lives and structures below them.

Years ago, Professor Emeritus of Geology Garniss Curtis and civil engineer Ben Lennert did field testing throughout the East Bay. They located the perimeter of the old volcano, whose constituent rocks, mud, and water press downhill on the strata of sandstone and shale that have been pushed up to a 30-degree angle by the Hayward Fault, moving up one centimeter a year. The plates along the Hayward Fault have moved north on the east and south on the west at the same rate. The stadium, constructed in 1923, is evidence of

Continued on Page Twenty-Six

PARTISAN POSITION

The Volcano Beneath

Continued from Page One

this offset, the crack on the south only partially disguised today by a huge image of a football player, but visible above it. The whole length of the stadium sits astride the fault.

When the predicted earthquake occurs, buildings and hills will most certainly slide, and the material squeezed up by the plates will cause even more damage. Researchers have said that Indian Rock and Founders' Rock were thrown up in a past event. Professor Curtis and Dr. Ignacio Chapela, associate professor of environmental science, explain in the video that the university's building plans, both at LBNL and at the stadium, create an unnecessary risk for the campus and the citizens of Berkeley.

For LBNL there are viable alternative sites. The university does own 50 acres of underutilized space at the Richmond Field Station with beautiful bay views, only 10 minutes farther from campus than the hill site.

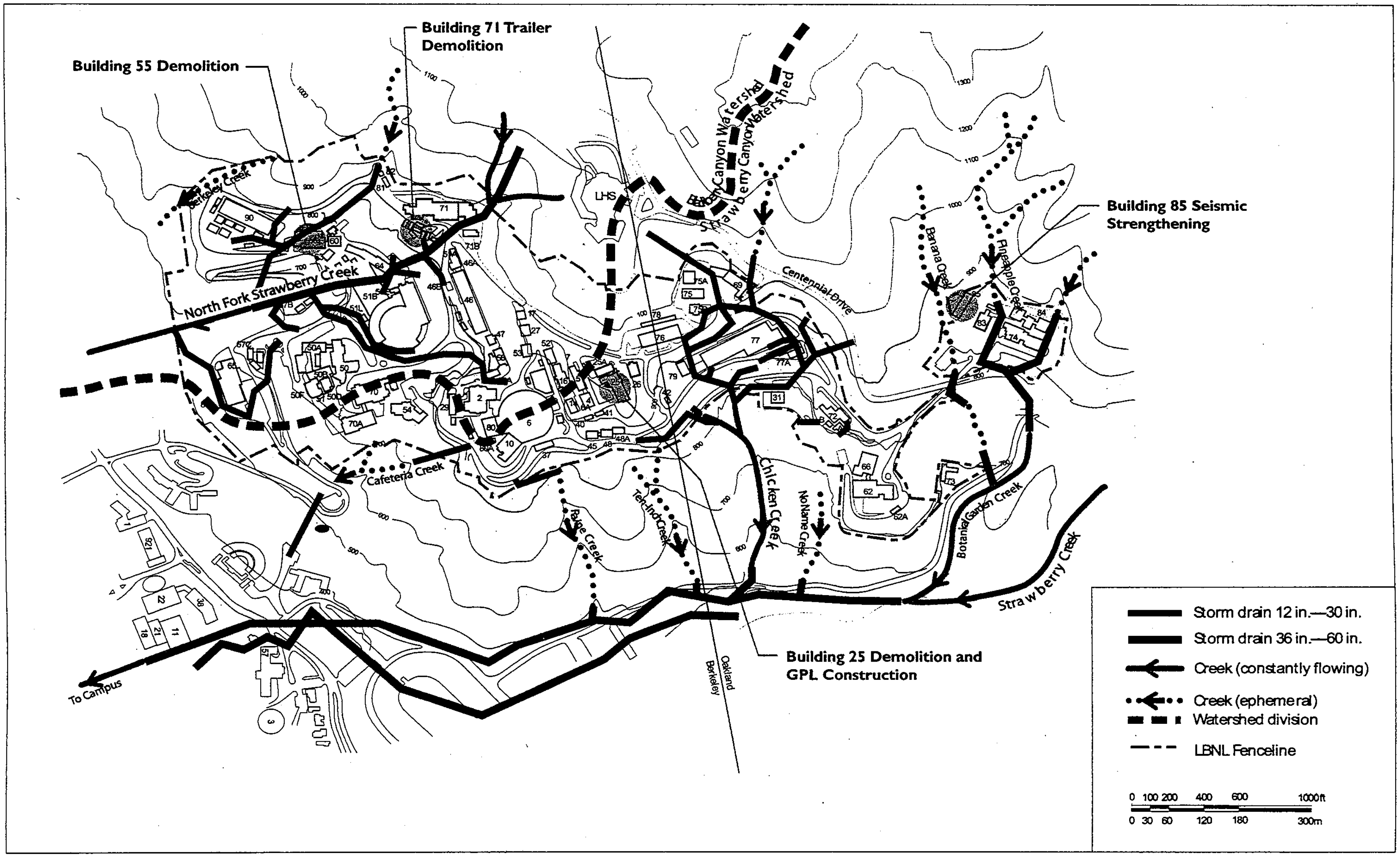
(It is ironic that the university recently engineered a state bill, with the help of the city of Berkeley, to exempt the stadium from the Alquist-Priolo Earthquake Safety Zoning Act.)

The regents are in charge of lives as well as buildings and research. The video, entitled *The Fault, Quakes, Slides, and the Lawrence Berkeley Lab,* contributes new information that should give everyone as well as the regents serious pause.

The YouTube video featuring Professors Curtis and Chapela can be found at www.youtube.com/watch?v=8FOmck-AHpes. More information is on the Save Strawberry Canyon website, www.savestrawberrycanyon.org.

CMTW-14

ATTACHMENT 2A.



Source: LBNL Environment, Health, and safety Division, 2009, Stormwater Pollution Prevention Plan, June, Page 2-5.

5.

5/83

CMTW-15

ATTACHMENT 2B.

§5.6 E. Stormwater

Berkeley Lab lies within the Strawberry Creek watershed, which covers an area of about 354 hectares (874 acres). There are two main creeks in the watershed, Strawberry Creek and the North Fork of Strawberry Creek, plus several small tributaries that generally do not flow all year long. This watershed includes other University of California property, public streets in both Oakland and Berkeley, and private property. Near Berkeley Lab, the Strawberry Creek watershed is further subdivided into the Blackberry Canyon and Strawberry Canyon watersheds (see Figure 5-4).

Surface runoff from Berkeley Lab is substantial because of the site's hillside location, the amount of paved or covered surface, and the moderate annual rainfall. In the 1960s, Berkeley Lab began installation of its storm drain system, which is designed to handle runoff intensities expected in a 25-year maximum-intensity storm. All stormwater runoff from the site drains through this system to Strawberry Creek or its north fork, which join below the Laboratory on the UC Berkeley campus.

Under the State of California's NPDES program, Berkeley Lab must follow the General Permit for Stormwater Discharges Associated with Industrial Activities.[6] Permit

CMTW-15 cont.

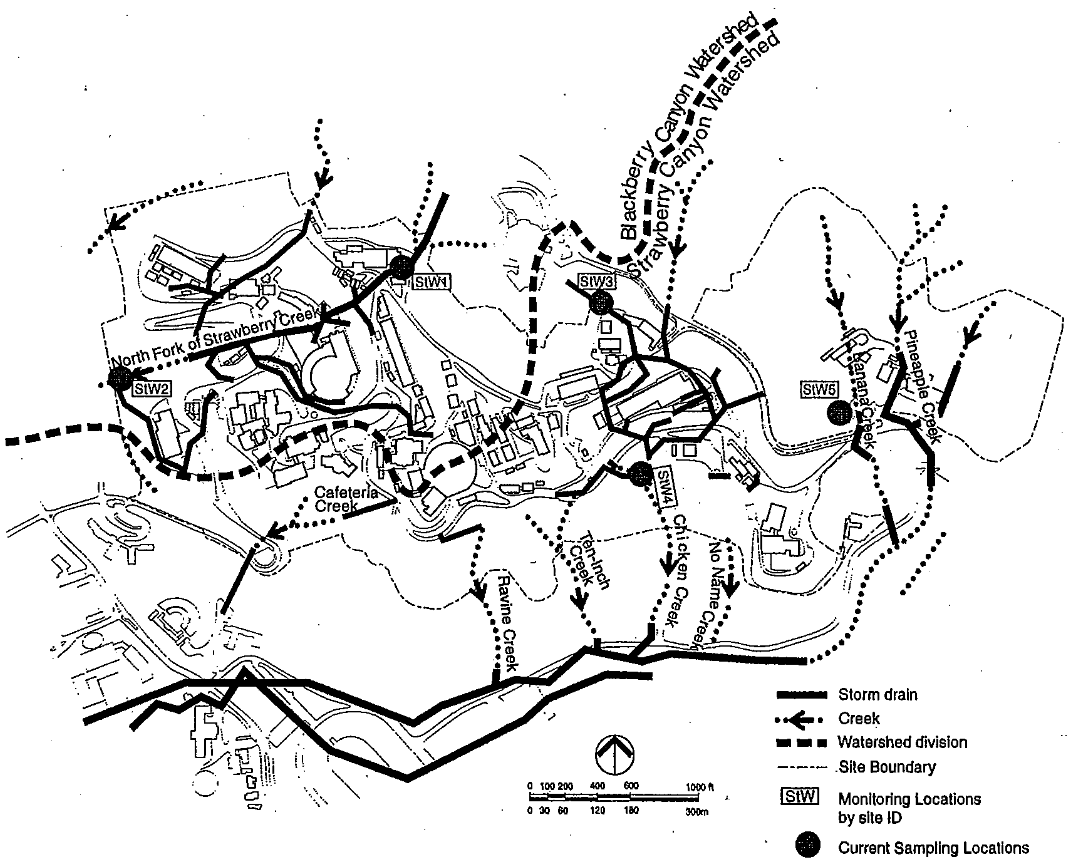


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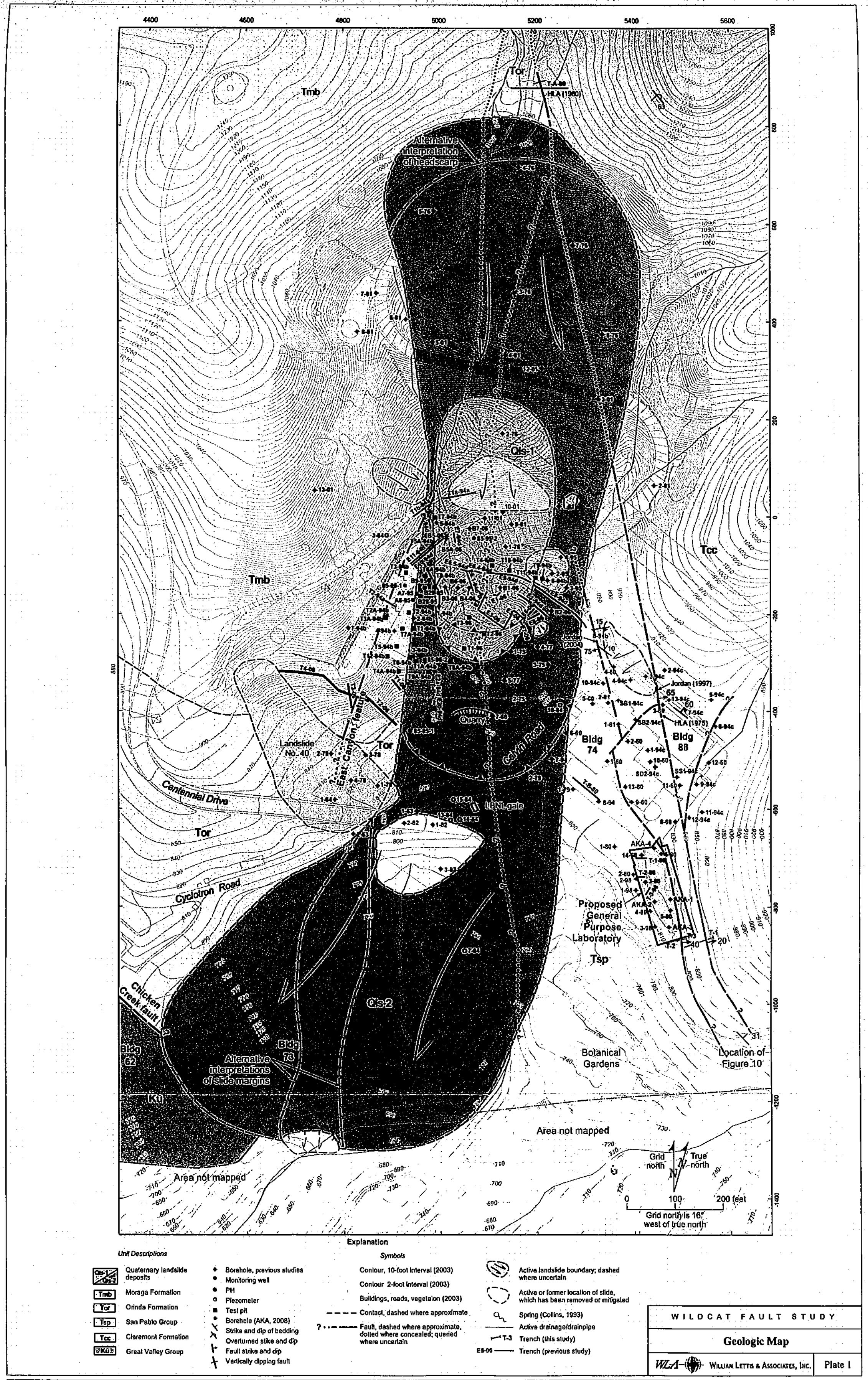
Figure 5-4 Stormwater Sampling Locations

6/83

A



CMTW-16

FIGURE 4.5-2

GEOLOGIC MAP OF THE EAST CANYON AREA

7.

7/83

6/83

ATTACHMENT 3B

Figure 5. Historical springs and water development are shown for Strawberry Canyon Watershed as mapped by Soulé (1875). Springs d, f, g and h, which are highlighted in yellow, plot very closely to the trace of the ECF according to Borg (1991).

8.

CMTW-16 cont.

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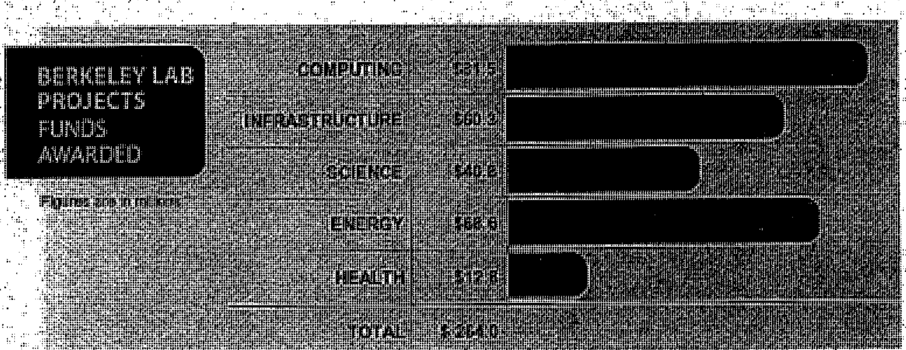

LAWRENCE BERKELEY NATIONAL LABORATORY/COURTESY

Berkeley Lab Reaps Benefits of Stimulus

by **Cristian Macavei**
Contributing Writer

While double-digit unemployment continues to plague many areas of the country, federal stimulus grants are funding research at Lawrence Berkeley National Laboratory that may lead to long-term economic growth.

ONLINE PODCAST Cristian Macavei talks about the stimulus grants to Berkeley lab.

About $264 million has been allocated to the lab since March 2009 through the American Recovery and Reinvestment Act for research in computing, energy, health and other sciences.

"Last year, we made the largest investment in basic research funding in history, an investment that could lead to the world's cheapest solar cells or treatment that kills cancer cells but leaves healthy ones untouched," said President Obama in his State of the Union address last week.

The lab is pursuing a variety of projects in areas such as energy, biofuels and computing that will provide scientific benefits in the future, according to Julie Chao, a lab spokesperson.

"The $11.3 million for the Advanced Light Source, one of the world's brightest sources of ultraviolet and soft X-ray beams, alone will facilitate scientific discoveries in everything from disease research to alternative fuels," she said in an e-mail.

Another stimulus grant, a $12.8 million grant from the National Institutes of Health, will help fund research into radioactive decontamination, cancer and other health conditions, according to a lab statement.

The institutes awarded $4.2 million of the grant to the lab's two-year radioactive decontamination project. The funding will allow researchers to further develop two molecules that may better treat nuclear contamination.

About $81.5 million for computing research and development and $60.3 million for infrastructure spending has been awarded to the lab since March 2009, according to a lab statement.

Chao said in an e-mail that the first portion of the stimulus money was allocated to the lab for infrastructure projects, while additional funding for science and research came in later months. Many projects are still under development.

"Many of them are still hiring, purchasing equipment, setting up experiments and so forth," she said. "A good number of these are multi-year projects."

At least 192 jobs have been created or retained as of Dec. 31, 2009 due to the influx of stimulus funding, according to Chao.

"All kinds of jobs have been created and retained thanks to the Recovery Act funding, from construction workers and electricians to research assistants, project managers, engineers and, of course, scientists," she said in the e-mail. "Plus, through the procurement of goods and services, many jobs have been created or retained at vendors and subcontractors, both locally and nationally."

The lab itself has seen its budget—most of which comes from the U.S. Department of Energy—increase by about $58 million since the 2008 fiscal year to about $648 million in the 2009 fiscal year, according to a November 2009 lab statement. $11 million of the increase came from stimulus funding.

The lab's budget is estimated at $774 million for the 2010 fiscal year, with about $122 million from stimulus funding, according to the statement.

Chao said federal agencies are allocated

>> STIMULUS: PAGE 2

9.

STIMULUS: Research Spending May Boost Economy

FROM FRONT

money by Congress, which they then route for specific use to laboratories such as Berkeley lab.

Mike Janes, a spokesperson for New Mexico-based Sandia National Laboratory, said in an e-mail that the Sandia lab has received $45.3 million of stimulus funding from the act as of Jan. 22 this year. $21.9 million has been assigned for capital funding and $23.4 million has been assigned for operating funding.

Sandia is using the stimulus funds to develop low-carbon energy solutions and to address key energy security challenges, such as reducing U.S. oil dependence, Janes said.

John Ellwood, a UC Berkeley professor in the Goldman School of Public Policy, said it is important to consider which funding would most effectively stimulate the economy.

"The interesting thing is we are awash in research money while we are starved at the state," he said.

Stimulus funding for research would not necessarily temper stubborn unemployment rates, Ellwood said.

"Someone could argue that the cost per job created will be very high with stuff at the labs because you'll have to buy lots of expensive equipment and lots of expensive labor," he said.

But stimulus spending for research will allow the American economy to grow in the long run, he said. Additionally, the funding will provide needed resources for university-related projects.

"As a resident of California and as a faculty member of Berkeley, this stuff is great," Ellwood said. "The money is coming from all American taxpayers, and it's going to California and to the University of California, which we in a narrow selfish world love."

Cristian Macavei covers research and ideas. Contact him at cmacavei@dailycal.org.

ATTACHMENT 4A

CMTW-17

ATTACHMENT 4B

10/83

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THE DAILY CALIFORNIAN

Berkeley, California — Monday, March 30, 2009 — www.dailycal.org

RESEARCH & IDEAS

Lawrence Berkeley Lab Gains Federal Funds

by **Christine Chen**
Contributing Writer

Lawrence Berkeley National Laboratory will receive $115 million as part of President Barack Obama's American Recovery and Reinvestment Act, as announced by Secretary of Energy and former director of the lab Steven Chu last week.

The funding comes from a portion of the $787 billion act Obama signed in February aimed to move research forward at major science institutions, while creating new jobs at the same time.

"Most of these projects (being funded by the act) have to do with infrastructure upgrades, and a number of those have been approved, but we have not received any of the money yet," said Jeff Miller, a spokesperson for the lab.

Among the projects that will be funded is the construction of a lab and office building for the Advanced Light Source synchrotron, a soft X-ray light source used by scientists to learn more about atomic structure.

About $14.3 million will go toward constructing a building next to the synchrotron as well as toward the ongoing project of demolishing the Bevatron, an older particle accelerator, to make room for new science buildings.

Another $1.5 million will go toward maintenance for the synchrotron, which is an open facility used by two thousand scientists and industries per year, said Roger Falcone, director of the synchrotron and a UC Berkeley professor of physics. The lab will need to hire about three dozen extra construction workers, he said.

"This will accelerate the completion of the project and fulfill the other half of the requirement of stimulus funding, which is to create jobs, so it provides additional work for the construction field," Falcone said. "It will accelerate the process, which will make the research happen sooner."

Another proposed project at the lab is the Berkeley Lab Laser Accelerator, which scientists anticipate will receive $19 million. The money could

>> LAB: PAGE 2

$115 Million

VICTORIA CHOW/STAFF

Money the lab will receive from the economic stimulus bill

Projects the money will fund include:

- Construction for the Advanced Light Source synchrotron
- Demolition of the Bevatron
- Completion of the Berkeley Lab Laser Accelerator

SOURCE/LAWRENCE BERKELEY NATIONAL LABORATORY

LAB: Funding May Help Create New Jobs

FROM FRONT

potentially fund 50 to 60 new employees to do technical work on the laser system.

Because the high-energy laser system produces a large electric field, it can be built at a smaller scale than normal-sized accelerators while producing the same amount of energy, said Wim Leemans, director of the project. He said while the project received high ratings among scientists, there wasn't enough funding available to build it until recently.

"We were afraid we would lose our leadership in this area, and now we're back in the position so we can maintain the lead," Leemans said. "They told us that we would have gotten money about two years from now, but they would have to spread the project out more years than we wanted. Now, with the (act), we can do it on a much faster timescale, so it allows us be competitive with the rest of the world."

10.

CMTW-17
cont.

Since 1940, land use and planning at LBNL has been sporadic, haphazard, initially due to the secret nature of the Manhattan Project and later, during the cold war, the culture of secrecy continued under the Atomic Energy Commission and Department of Energy. If indeed UC considers this site to be a viable Hill Campus – now is the time to finally determine that fact, and if the unconsolidated soils of the collapsed caldera are deemed **unsuitable** for future development, it is critical that no more taxpayer funds be wasted into this landsliding, fault fractured sinkhole, but instead in the future of a new LBNL campus in Richmond or Oakland! CMTW-18 CMTW-19

Sincerely,

Pamela Sihvola

Pamela Sihvola
CMTW
P.O. Box 9646
Berkeley, CA 94709

PS. What is the total estimated cost of the Project? Please list projected costs per each Project component. CMTW-20

How much of the Project is funded by LBNL's $ 264 million ARRA funds? Please list ARRA funded portions, in dollar ($) amounts per each Project component. CMTW-21

CONTAMINANT PLUMES OF THE LAWRENCE BERKELEY NATIONAL LABORATORY AND THEIR INTERRELATION TO FAULTS, LANDSLIDES, AND STREAMS IN STRAWBERRY CANYON, BERKELEY AND OAKLAND, CALIFORNIA

Laurel Collins, Geomorphologist
Watershed Sciences
1128 Fresno Ave
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for

Pamela Sihvola, Project Manager
Committee to Minimize Toxic Waste
P.O. Box 9646
Berkeley, California 94709

INTRODUCTION

The Lawrence Berkeley National Laboratory (LBNL), initially called the UC Radiation Laboratory, was originally located on the University of California Berkeley (UCB) central campus in Alameda County during 1932. By 1940, it was relocated to its present site in the steep hills of Strawberry Canyon east of the Hayward Fault and the central UCB campus (Figure 1). The first major facility, the 184-inch synchrocyclotron was built with funds from both private and university sources, and was used in the Manhattan Project in the development of the world's first nuclear bomb. Beginning in 1948 the U.S. Atomic Energy Commission and then its successor agency, the Department of Energy (DOE) funded the lab while it continued to expand its facilities in Strawberry Canyon. CMTW-22

Numerous geotechnical investigations have been conducted during the past six decades as LBNL expanded while also experiencing problems with slope stability. The many geotechnical and environmental reports generated by LBNL, as well as research from local academic, state, and federal entities, indicate that minimal agreement has existed among scientists on the location of bedrock contacts or location and status of earthquake faults and landslides in the Canyon.

This is important because LBNL has been required to monitor radioactive accidents and chemical releases that have contaminated the groundwater and tributary streams of Strawberry Creek, which flow westward from the jurisdictional boundaries of Oakland to Berkeley and the UCB Campus. There has been concern by the public that mitigation to protect public health might be compromised by the lack of comprehensive (and agreed upon) information on the potential transport pathways of contaminants along bedrock contacts, faults, and landslides. Without such information, the array of sampling wells

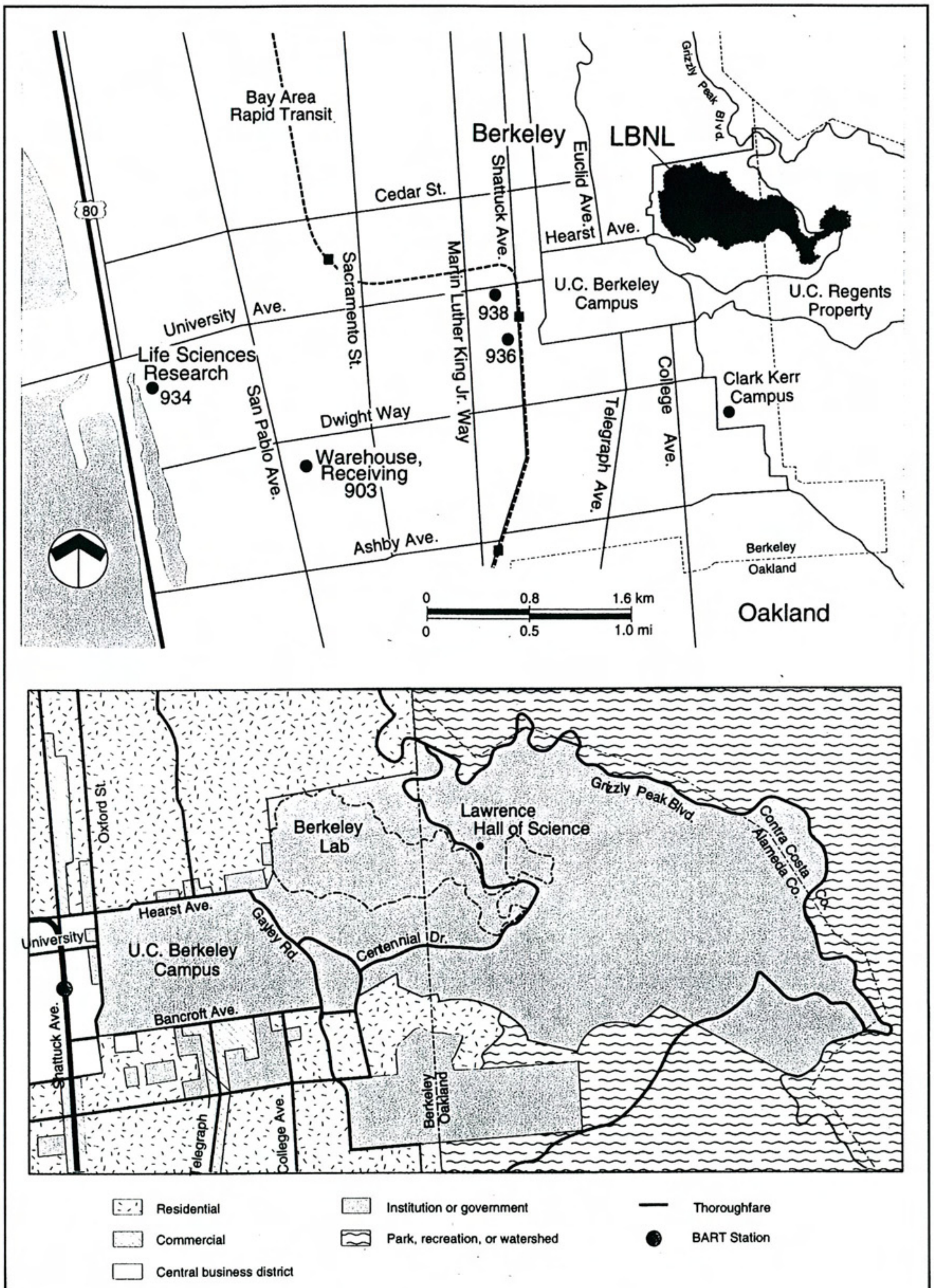

FIGURE 1. VICINITY AND ADJACENT LAND USE. Source: LBNL RCRA Facility Investigation Report, (also known as LBNL, 2000).

CMTW-22 cont.

/83

designed to monitor contaminant migration have not been strategically placed to define the limits of contamination or potential plume migration. During 1991, the Department of Energy's (DOE) Tiger Team found 678 violations of DOE regulations that cover management practices at LBNL. A key finding was that air, soil, and water in Berkeley and Oakland are contaminated with tritium and other radioactive substances and toxic chemicals.

Our project and this report "Contaminant Plumes of the Lawrence Berkeley National Laboratory and their Interrelation to Faults, Landslides, and Streams in Strawberry Canyon, Berkeley and Oakland, California" was supported by a grant from the Citizens' Monitoring and Technical Assessment Fund (MTA Fund) to the Committee to Minimize Toxic Waste (CMTW). The report addresses the need to compile and develop publicly accessible maps of Strawberry Canyon, which show the geologic and geomorphic characteristics that might influence ground and surface water movement near known LBNL contaminant sites. The intent of this map compilation project is to show where there is or is not agreement among the various technical reports and scientific interpretations of Strawberry Canyon. This report can be found on the following web site: http://www.cmtwberkeley.org

OBJECTIVES

The specific objectives of the project were:

1) Help define or show where there is potential confusion or disagreement about the location of geological units and associated faults by showing interpretations by various science organizations.
2) Help define the historical channel and landslide network.
3) Locate verifiable bedrock outcrops as the basis for geologic interpretation;
4) Identify sites of slope instability, especially those associated with groundwater, and landslides;
5) Synthesize surface geotechnical information with contaminant plume information for the greater Strawberry Canyon area on a common base map.
6) Post results of technical report on CMTW's web site.

CMTW-22 cont.

This project provides necessary information to better evaluate the status of existing geological knowledge for Strawberry Canyon and the potential for contaminant migration pathways at existing plumes sites. By achieving a common base of understanding, a more effective monitoring and mitigation plan can be developed for the contamination sites. Benefits will also be provided for future geotechnical investigations during expansion of facilities at either LBNL or UCB. We have started by compiling available information on a series of overlays that show:

a) Current stream and storm drain network, and all sewer lines and hydraugers, delineation of the Lennert Aquifer;

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b) Interpretation of historic drainage network and springs as indicated on the Map of Strawberry Valley and Vicinity Showing the Natural Sources of the Water Supply of the University of California, by Frank Soulé, Jr. 1875;
c) Geology;
d) Faults, seismicity, and Alquist Priolo Earthquake Fault Zone;
e) Landslides;
f) Areas of contamination evaluated in the Resource Conservation and Recovery Act (RCRA) process;
g) Additional toxic sites located outside the LBNL fence line, but on UC land, such as the old waste pit at the former Chicken Creek animal husbandry site as well as groves of trees and vegetation, south of the Lawrence Hall of Science, contaminated with tritium (radioactive hydrogen) in soil;
h) Topography with building sites, and roads.

REPORT ORGANIZATION

This report is specifically designed to demonstrate what is known about the key components of Strawberry Canyon that can influence surface and subsurface water transport, particularly near infrastructure and known contaminant plumes at LBNL. We have taken the key elements of surface drainage, geology, faults, and landslides and divided them into distinct subsections for this report.

We first provide a General Site Description and then provide information about the Contaminant Sites. This is followed by a brief discussion of Methods used in this report to produce original maps and compile existing information. Within the Results section, each subsection on Surface Drainage, Geology, Fault mapping, and Landslides provides background information and a few smaller scale maps showing recent interpretations. Larger maps are provided to show compilations of recent information.

CMTW-22 cont.

These compilations are used to determine whether there is agreement by different researchers about the location of faults, bedrock contacts, or landslides. Each compilation map shows the contaminant plumes in the context of the different physical elements to determine if those elements could have potential influences on contaminant transport. The Plume Monitoring Sites are then shown to indicate the array and position of sampling and monitoring wells. This latter information is presented in much detail in several online documents produced by LBNL (2000, 2003, 2004 and 2007) that can be downloaded from their web site (www.lbl.gov/ehs/index2.shtml).

Within the Results subsection, a map on Zones of Concern is provided that indicates potential groundwater migration sites near each plume that might not be adequately sampled or understood given the present status of knowledge of factors that can influence groundwater transport. A map showing Future Development and Site Conditions and the compilation of potential factors that could influence plume migration is shown as the final map within the Results section. Conclusions and General Recommendations are provided at the end of the report.

GENERAL SITE DESCRIPTION

LBNL is located in a very seismically active area, next to the Hayward Fault on the steep west facing slopes of the Berkeley Hills within the 874-acre Strawberry Canyon. Figure 2 shows the location of the Alquist Priolo Earthquake Fault Zone and the footprint of buildings and roads in Strawberry Canyon. It also shows the location of several known contaminant plumes that are monitored by LBNL. The nature of these plumes is discussed further in the section on Contaminant Sites. The building sites and their associated numbers are shown in Figure 3a, while Figure 3b provides a legend to the building numbers.

Topographic relief in the canyon ranges from 400 feet to 1800 feet, whereas elevations within the LBNL boundary range from about 500 feet to 1000 feet. The Mediterranean climate of the Coast Ranges produces a mean annual rainfall of about 28 inches. Within the LBNL site, two major east-west trending creeks, Strawberry and North Fork of Strawberry, have perennial flow that drains respectively through Strawberry and Blackberry Canyons toward the City of Berkeley and the San Francisco Estuary.

CONTAMINANT SITES
Chemical and Hazardous Contamination

LBNL operations fall under a Resource Conservation and Recovery Act (RCRA) Hazardous Waste Facility Permit. The Permit requires that LBNL investigate and address historic releases of hazardous waste and hazardous constituents within their property as part of the RCRA Corrective Action Program. LBNL's Environmental Restoration Program is responsible for carrying out these activities.

CMTW-22 cont.

Waste products at the LBNL have included solvents, gasoline, diesel fuel, waste oils, polychlorinated biphenyls (PCBs), Freon, metals, acids, etchants, and lead and chromate based paints. According to the LBNL RCRA Facility Investigation (RFI) Report (2000), the primary contaminants detected in soil and groundwater at LBNL have been volatile organic compounds (VOCs) including tetrachloroethene (also known as tetrachloroethylene or perchloroethene [PCE]), trichloroethene (also known as trichloroethylene [TCE]), carbon tetrachloride, 1,1-dichloroethene (1,1-DCE), cis-1, 2-dichloroethene (cis-1, 2-DCE), 1,1,1- trichloroethane (1,1,1-TCA), and 1,1-dichloroethane (1,1-DCA). Some of these are common solvents and degreasers that have been used at LBNL for equipment cleaning. Smaller concentrations of other VOCs (e.g., benzene, toluene, ethylbenzene, and xylenes [BTEX]; chloroform; and vinyl chloride) have also been detected.

The LBNL RFI (2000) reported that contamination of soil and groundwater by petroleum hydrocarbons was associated with former underground storage tank sites and that PCB contamination has been primarily associated with spilled transformer oils and waste oil tanks. Freon- 113, a coolant for experimental apparatus, has been detected in groundwater south of Building 71.

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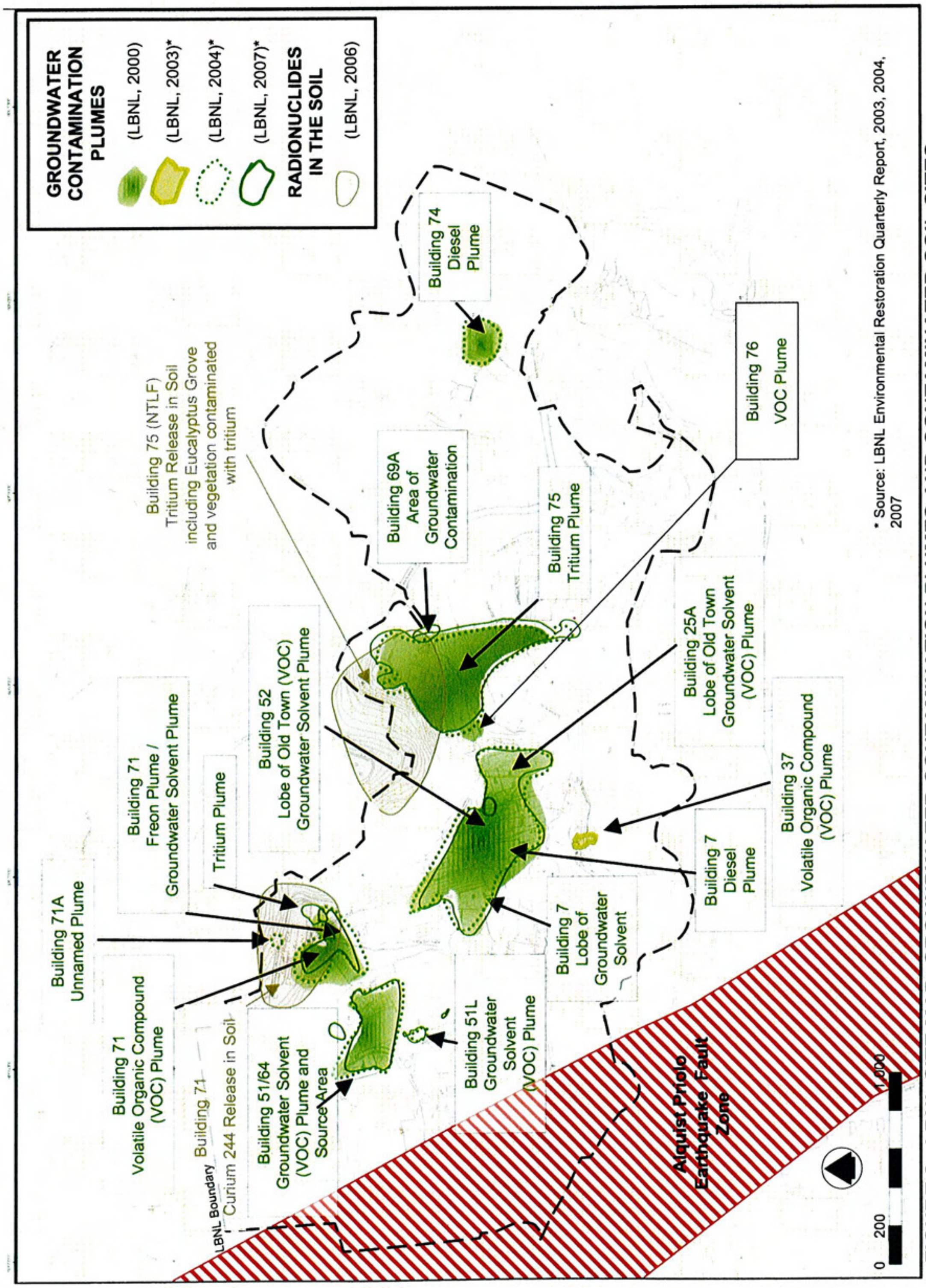

FIGURE 2. LBNL SITE MAP, GROUNDWATER CONTAMINATION PLUMES AND CONTAMINATED SOIL SITES.

CMTW-22 cont.

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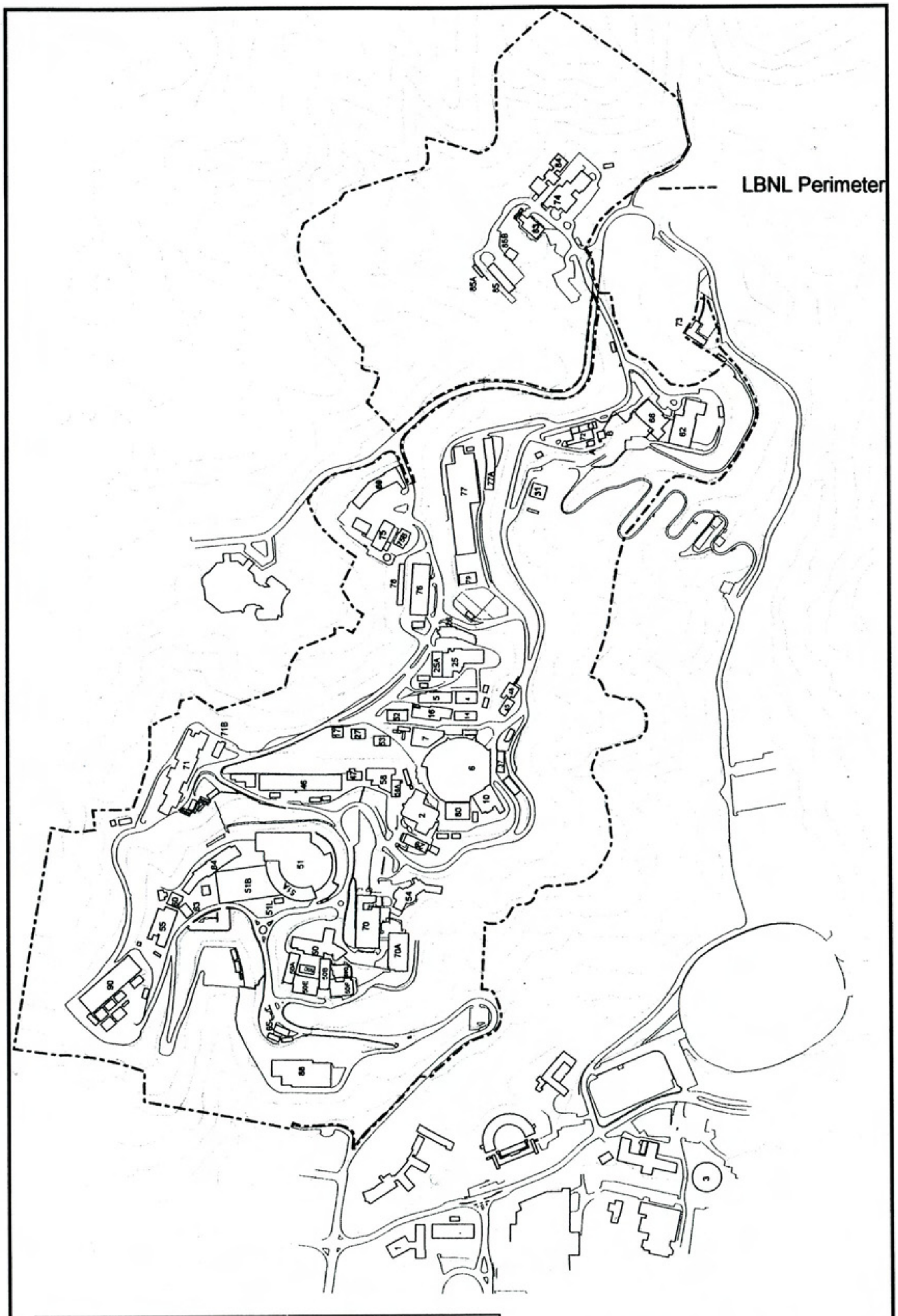

FIGURE 3a. BUILDINGS AT LBNL.
Source: LBNL RCRA Facility Investigation Report, (also known as LBNL. 2000).

CMTW-22 cont.

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2	Advanced Materials Laboratory (AML)	55	Life Sciences
2a	Materials Storage	55A	Life Sciences
4	ALS Support Facility	55B	Emergency Generator
4A	Safety Equipment Storage	55C	Life Sciences
5	Accelerator and Fusion Research	56	Biomedical Isotope Facility
5A	Mechanical Storage	58	Heavy Ion Fusion
5B	Electrical Storage	58A	Accelerator Research & Development
6	Advanced Light Source (ALS)	58B	Lubricant and Solvent Storage
7	ALS Support Facility	60	High Bay Laboratory
7A	Radio Shop	61	Standby Propane Plant
7C	Office	62	Materials & Chemical Sciences
10	ALS Support Facility	62A	Environmental Energy Technologies, Materials Sciences
10A	Utility Storage	62B	Utility Storage
13A-C	Environmental Monitoring	63	Environmental Energy Technologies
13E,F	Sewer Monitoring Station	64	B-factory, Life Sciences
13G	Waste Monitoring Station	64B	Riggers
13H	Radiation Monitoring Station	65	Site Access Office
14	Earth Sciences Laboratory	66	Surface Science Catalysis Lab, Materials Sciences, Center for Advanced Materials
16	Accelerator and Fusion Research Laboratory	67B,C	Environmental Energy Technologies
17	EH&S	67D	Mobile Infiltration Test Unit
25	Engineering Shop	67E	Environmental Energy Technologies Field Lab
25A	Engineering Shop	68	Upper Pump House
25B	Waste Treatment Facility	69	Archives and Records, Shipping
26	Health Services, EH&S	70	Nuclear Science, Environmental Energy Technologies
27	ALS Support Facility	70A	Chemical Sciences, Earth Sciences, Engineering, Life Sciences, Nuclear Science
29	Engineering, Life Sciences	70B	Utility
29A,B	Engineering	70E	Storage
29C	Environmental Energy Technologies	70G	Liquid Nitrogen Storage
31	Chicken Creek Maintenance Bldg., Earth Sciences	71	Center for Beam Physics, Ion Beam Technology
31A	Earth Sciences	71A	Ion Beam Technology, Low Beta Lab
34	ALS Chiller Building	71B	Center for Beam Physics
36	Grizzly Substation	71C,D,F,H,J,P	B-factory
37	Utilities Service	71K	Accelerator and Fusion Research, B-factory, Chemical Sciences
40	Engineering Electronics Lab	72	National Center for Electron Microscopy (NCEM)
41	Engineering Communications Lab	72A	High Voltage Electron Microscope (HVEM)
42A	Emergency Generator House	72B	Atomic Resolution Microscope (ARM)
43	Compressor Bldg.	72C	ARM Support Laboratory
44	Indoor Air Pollution Studies	73	Atmospheric Aerosol Research
44B	Environmental Energy Technologies	74	Life Sciences Laboratory
45	Fire Apparatus	74C	Emergency Generator
46	Accelerator and Fusion Research, Engineering, Environmental Energy Technologies, Photography Services, Printing	75	Radioisotope Service & National Tritium Labeling Facility (NTLF)
46A	Engineering Div. Office	75A,B,C	Environment, Health & safety
46B	Engineering	76	Facilities Shops, Motor Pool/Garage
46C, D	Accelerator and Fusion research	77	Engineering Shops
47	Accelerator and Fusion research	77A	Ultra High Vacuum Assembly Facility (UHV)
48	Fire Station	77C	Welding Storage
50	Accelerator & Fusion Research, Physics, Library	77D	Drum Liquid Storage
50A	Director's Office, Nuclear Science, physics	77H	Auxiliary Plating
50B	Physics, Computing Sciences	77J-N	Chemical Storage
50C	Computing Sciences, NERSC	78	Craft Stores
50D	Center for Computational Sciences and Engineering	79	Metal Stores
50E	Computing Sciences, Offices	80	ALS Support Facility
50F	Computing Services	80A	ALS Support Facility
51	Technical and Electronics Information	81	Liquid Gas Storage
51A	Bevatron	82	Lower Pump House
51B	External Particle Beam (EPB) Hall	83	Life Sciences Laboratory
51F, G	Nuclear Science	84	Human Genome Laboratory
51L	Computer Training Center	85	Hazardous Waste Handling Facility
51N, Q	Earth Sciences	88	88-Inch Cyclotron, Nuclear Science
52	Cable Winding Facility	88B	Compressor Shelter and Storage
52A	Utility Storage	88C	Flammable Gas/Liquid Storage
52B	ALS Support	88D	Emergency Generator
53	Environmental energy technologies	90	Copy Center, DOE Site Office, Earth Sciences, Environmental Energy Technologies
53A	Gardner's Storage	90B,F,G,H,J,K	Facilities
53B	Accelerator and Fusion Research	90C, P	Earth Sciences
54	Cafeteria	90R	Utility Storage

FIGURE 3b. KEY TO LBNL BUILDINGS SHOWN IN FIGURE 3a. Source: LBNL, 2000

CMTW-22 cont.

The Human Health Risk Assessment (LBNL, 2003) identified chlorinated volatile organic compounds in soil and groundwater and PCBs in soil as chemicals of concern (COC) at LBNL. Prior to submission of the Corrective Measures Study (CMS) Report, Berkeley Lab completed Interim Corrective Measures (ICMs) that reduced residual PCB concentrations at the two units where PCB levels were a concern to less than the required media clean-up standard. LBNL (2007) discusses that after submittal of the Corrective Measures Implementation Work plan, elevated concentrations of PCBs were detected in shallow groundwater samples collected near the Building 51 Motor Generator Room Filter Sump, indicating PCBs were a potential COC in the soil at this location.

Groundwater is not used for drinking or other domestic water supply at LBNL. Water is supplied to LBNL and Berkeley residents by the East Bay Municipal Utility District (LBNL, 2007). In addition there are many private backyard wells in the city. Unless otherwise designated by the State's Water Quality Control Board, all groundwater is considered suitable, or potentially suitable, for municipal or domestic water supply. Exceptions to this policy are specified in State Water Resources Control Board Resolution 88-63.

Resolution 88-63 defines all groundwater as a potential source of drinking water, with limited exceptions for areas with total dissolved solids exceeding 3,000 milligrams per liter (mg/L), low yield (<200 gallons per day [gpd]), or naturally high levels of toxic chemicals that cannot reasonably be treated for domestic use. Under the Water Board's Water Quality Control Plan, groundwaters with a beneficial use of municipal and domestic supply have cleanup levels set no higher than Maximum Contaminant Levels (MCL's) or secondary MCLs for drinking water.

CMTW-22 cont.

The following descriptions from the 2007 Draft LBNL Long Range Development Plan (LRDP) report exemplify some of the conditions and circumstances at the contaminant sites. Note that Old Town is in the general vicinity of Buildings 25 and 52, near the central land holdings of LBNL. All plumes can be seen in Figure 2. Further details can be found within the referenced reports.

> The Old Town Groundwater Solvent Plume is a broad, multi-lobed plume of VOC contaminated groundwater, which underlies much of the Old Town area. The distribution of chemicals in the plume indicates that it consists of three coalescing lobes that were originally discrete plumes derived from distinct sources. The Building 7 lobe, which contains the highest VOC concentrations of the three lobes, extends northwestward from the northwest corner of Building 7 to the parking area downhill from Building 58. Leaks and/or overflows of VOCs (primarily PCE) from the Former Building 7 Sump, an abandoned sump that was located north of Building 7, were the primary source of the Building 7 lobe. These chemicals were initially released as free product to the soil around the sump and then migrated as dense non-aqueous-phase liquid (DNAPL) into the saturated zone, forming a source zone for further migration of contaminants. Continuing dissolution of contaminants from the soil and westward to northwestward flow of the groundwater from the sump area has resulted in the development of the Building 7 lobe of the Old Town Groundwater Solvent Plume.

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> Contaminated soil and groundwater were present beneath the area where Building 51L was located. The principal contaminants were VOCs that were used as cleaning solvents, or were derived from degradation of cleaning solvents. In addition, a small area of VOC-contaminated soil was present beneath the abandoned Building 51A stormdrain catch basin next to the Building 51A B-door. Contaminated soil in the bottom of the catch basin was removed in 2002. However, groundwater samples from temporary groundwater sampling point SB51A-01-8B installed through the catch basin have contained elevated VOC concentrations, suggesting the presence of additional contaminated soil beneath the catch basin.
>
> A network of subdrains and relief wells located around the perimeter of Building 51 collects subsurface water from the adjacent hillside. Water collected by this network discharges to the Motor Generator Room Filter Sump, which is part of the Building 51 internal floor-drain system. After submittal of the Corrective Measures Implementation (CMI) Work plan, elevated concentrations of PCBs were detected in shallow groundwater samples collected near the sump, indicating that PCBs were a potential COC in the soil at this location.
>
> The Building 51/64 Groundwater Solvent Plume extends south and west from the southeast corner of Building 64 beneath the former location of Building 51B. The corrective measures required for the Building 51/64 Groundwater Solvent Plume consist of operation of an in situ soil-flushing system in the up gradient portion of the plume, implementation of Monitored Natural Attenuation in the down gradient portion of the plume, and collection and treatment of water from the Building 51 subdrain system.

CMTW-22 cont.

The location of the Building 69A Area of Groundwater Contamination is shown in Figure 2. The most likely source of the contamination was leakage from a pipeline in the Building 69A Hazardous Materials Storage and Delivery Area that drains to the Building 69A Storage Area Sump. A dislocation was observed in one of the sump drainpipes and repaired in 1987.

Radioactive Contamination

Since November 1991, the State of California Department of Toxic Substances Control (DTSC) and LBNL have identified 174 "units" of hazardous contamination in the Strawberry Creek Watershed. At least 8 of these 174 "units" were identified as having radioactive contamination. At the same time the California Department of Health Services (DHS) also participated as an additional quality assurance check and provided independent laboratory results to complement LBNL's environmental monitoring programs.

In September of 1995, the California Department of Health Services (DHS) Environmental Management Branch released the Agreement in Principle (AIP) Annual Report, which identified LBNL's National Tritium Labeling Facility (NTLF), Building 75 as a major concern for radioactive contamination in the environment. The AIP report states:

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> This facility (NTLF) handles kilocurie quantities of tritium (^3H) to label a variety of molecules that are subsequently employed in chemical, pharmaceutical, and biomedical research. It is conceded that releases from the tritium-stack as well as fugitive releases from Building 75 are the primary source of tritium at LBNL. Air-fall, rainout, and possibly transport in fog impacts soil, groundwater, and surface water. There is an area of tritium contaminated groundwater in the vicinity of Building 75. The Quarterly Progress Report, First Quarter FY 1992, (May 1993) reports sampling ten hydraugers, one, immediately down-slope from NTLF, reportedly contained 32,000 pCi/L of tritium.

The AIP Program collected and analyzed surface water samples, which demonstrated that tritium is detectable in surface water around LBL. The AIP further states:

> One recent investigation, by Leticia Menchaca (LBNL), analyzing for tritium in transpired vapor from plants on LBNL suggest that there may be significant amounts of tritium in the upper, non-saturated, soil strata. It appears that there may be sufficient evidence to suggest that there may be more tritium in the environment than previously suspected. There are apparently no validated explanations for the appearance of tritium in streams not obviously associated with NTLF. (See Table 1)

During the above referenced investigation, tritium concentration in rainwater was detected as high as 239,000 pCi/L and 197,946 pCi/L in transpired water vapor from trees near the University of California's Lawrence Hall of Science.

Table 1. Comparison of Tritium Levels from Split LBNL Surface Water Samples

Collection Date: June 15, 1995 (Table LBNL-6c, AIP Report, 1995)

CMTW-22 cont.

Location	AIP Results	AIP Duplicate	LBNL Results
	(pCi/L)	Results (pCi/L)	(pCi/L)
Blackberry Creek	3335 ± 255		
Claremont Creek	< 328		
Wildcat Creek	1147 ± 218	944 ± 214	
Lower Strawberry Creek	5902 ± 294		
Upper Strawberry Creek	< 328	< 328	

In addition, the AIP report expressed concern over the release of Curium-244 from Building 71, the Heavy Ion Linear Accelerator (HILAC). It states:

> An area of soil near Building 71 is historically (circa 1959) reported to have been contaminated with Curium-244 when a Curium target being used in an experiment was vaporized. Some of this contamination, reportedly, was transported by the buildings ventilation system and deposited outside. This is documented in two interviews in the RCRA Facility Assessment at LBL Sep. 30, 1992: this document reports that "Cleanup of curium contaminated concrete inside the building is documented but there is no record of sampling outside Bld. 71."

The AIP program's other concerns for radioactive contamination in the LBNL environs included former radioactive waste storage and staging areas, former radioactive decontamination areas and abandoned above ground radioactive waste holding tanks.

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In 1998, the US Environmental Protection Agency (EPA) performed a Superfund reassessment of LBNL concluding that "Based upon a preliminary Hazard Ranking System score, the US EPA has determined that LBNL is eligible for the National Superfund Priorities List" for cleanup, due to tritium in air, soil, groundwater, and surface water.

In September of 2001, LBNL announced that the NTLF would cease operations by 12/31/01.

In June 2005 National Academy of Sciences panel, formally known as the Committee on Biological Effects of Ionizing Radiation, or BEIR, concluded that there is no exposure level found below which dosage of radiation is harmless. The preponderance of scientific evidence shows that even very low doses of radiation pose a risk of cancer or other health problems. The National Academy of Sciences panel is viewed as critical because it addresses radiation amounts commonly used in medical treatment and is likely to also influence the radiation levels that the government will allow at abandoned and other nuclear sites.

METHODS

Our approach to developing a basic understanding of the contaminant plumes of the Lawrence Berkeley National Laboratory and their interrelation to faults, landslides, and streams in Strawberry Canyon was to develop a series of overlays that would show the conditions and various interpretations by previous investigations. The base map data sources were from the City of Berkeley and LBNL Facilities Division, the map projection: California State Plane, Zone III, (map scale 1:3000). Map layers for plumes, geology, faults, and landslides were scanned and then digitized as individual slides. **CMTW-22 cont.**

For the historic channel and landslide network mapping, a base map scale of 1-inch equals 200 feet was used to draw channels and landslides as they were interpreted from stereo aerial photographs and historic maps. The historic map of the drainage network was from Soulé (1875). The topographic projections of Soulé's 1875 base map were not compatible to present day cartographic or survey standards. The stream network, however, in most cases, seems to have a good representation of the number of tributaries and the relationship of one confluence to another. Because Soulé's map could not be digitized directly as an overlay, it was necessary to interpret his intent with regard to channel and spring mapping. This was accomplished by referring to predevelopment topographic maps shown in LBNL (2000) and by viewing stereo pairs of historical air photos, some of which predated development of the 1940's.

Different years of aerial photography were used to map landslides, landslide scars, and colluvial deposits. Three black and white photos were used for the earliest period that represented circa 1935. There were a few sections of stereo overlap in these photos, whereas all the newer photos had complete stereo coverage. The full stereo photo analysis included photos from 1939, 1946, 1947, and 1990. A distinction was made, when possible, to establish between deep-seated and shallow slides. Shallow slides were expected to be less than 30 feet deep, whereas deep-seated slides exceeded 30 feet. Source areas for shallow slides, called colluvial hollows, were also mapped. These source areas often contain scars of former landslides and in some cases have had recent sliding, but certainty was low from aerial interpretation. When there was a high certainty of activity occurring within the last century, the slides were delineated accordingly. Activity status of earthflows was not determined. However, at the very least, these slides should be expected to have higher than normal creep rates than the surrounding soils and they will probably continue to have renewed activity within their boundaries.

RESULTS AND DISCUSSION OF DATA COMPILATION

Drainage Network Mapping

Within the Lab site, two major east-west trending creeks, Strawberry and North Fork of Strawberry, have perennial flow that drains respectively through Strawberry and Blackberry Canyons toward the City of Berkeley and the San Francisco Estuary. North Fork of Strawberry Creek flows through the boundaries of LBNL. Mainstream Strawberry Creek is not within LBNL boundaries, yet seven of its north-south trending tributaries that flow southward, do drain from the LBNL. These tributaries, cited in the LBNL RFI, 2000 include Cafeteria Creek, Ravine Creek, Ten-inch Creek, Chicken Creek, No-name Creek, Banana, and Pineapple Creeks as shown in Figure 4. The latter two flow into Botanical Garden Creek, which is not within the LBNL boundary, but flows into the central reach of mainstream Strawberry Creek.

CMTW-22 cont.

The pathways of natural surface water runoff have been altered by years of land use activities in the Canyon, which have caused the natural topography to become highly altered by cut and fill activities, roads, impervious surfaces from buildings and parking lots, and by stormdrain and other infrastructure construction. Natural and land use-related landslides have also changed the flow pathways of both surface and groundwater. Numerous faults, deep-seated landslide failure planes, bedrock contacts, fractures, and joints compound the natural influences on groundwater. They can all strongly influence the direction and rate of subsurface flow.

However, the location of bedrock contacts and faults can be challenging to detect, especially in an unstable landscape where landsliding can mask the geomorphic signatures of faults and bedrock contacts. Overlaying surficial deposits from alluvial fans and colluvium can also obscure these features. Groundwater flow has also been artificially altered by spring development, wells, hydraugers, utility trenches, sewers, subsurface drains, and pumps installed to mitigate contamination, as well as to intercept hill water that historically has caused landslides at LBNL.

Campus Principal Engineer John Shively conceived of the idea of a vertical well to intercept hill-water that was causing landslides both inside and adjacent to LBNL in 1974. He retained Civil Engineer B. J. Lennert to install what is now known as the Shively well, located next to the UC Silver Space Sciences building. It should be noted that the major hill landslide of August 1974 (during a dry season) broke a lab building at LBNL, took out a portion of a laboratory road, and was threatening UC Berkeley's Lawrence Hall of Science.

At the same time another landslide was developing above the Lab's corporation yard, threatening the University's Centennial Drive. Lennert's attempts to stop the slides by dewatering the hill area with horizontal hydraugers weren't working. The Shively well apparently stopped both slides.

In 1984 Converse Consultants, Inc. conducted investigations in the eastern portion of the Strawberry Canyon. Their findings were published in a report titled "Hill Area Dewatering and Stabilization Studies" which defined the location of the Lennert Aquifer in the following:

> Dewatering measures instituted by Lennert were based on the belief that the main reservoir of deep ground water in the hill area is the volcanic flow (i.e., fractured) rocks of the Moraga Formation situated within a synclinal structure underlying the ridge extending from LBL Building 62 northward to Little Grizzly Peak. These flow rocks were thought to be bottomed in the syncline by less permeable Orinda Formation bedrock (although some permeable sandstone and conglomerate beds within the Orinda exist, they are interbedded with impermeable shales and siltstones). Lennert asserted that ground water was also controlled in the hill area by faults such as the University Fault and the New Fault, which acted as groundwater barriers or as conduits for water flow through cracks and voids along these faults. Lennert also asserted that surface water entered these "tension faults", entering directly and quickly into the groundwater regime.

CMTW-22 cont.

The location of the Shively well that drains the Lennert aquifer, hydraugers as well as sewers, and stormdrains at LBNL are also shown in Figure 4.

Little remains of the natural drainage network within LBNL boundaries, yet its natural pattern can been interpreted from historical photos and information from Soulé (1875), as shown in Figure 5. The drainage network does not depict differences in perennial versus intermittent or ephemeral flow; it simply indicates where well-defined channels are expected. The springs, however, do represent sites of presumed perennial wetness. Soulé indicated that several springs were developed for water diversion prior to his 1875 map. In Figure 5, the arrows represent where channels might have become non-distinct as they spread across their alluvial fans at the base of steep hillsides. Alluvial fans store bedload and often convert surface flow to subsurface flow over coarse-bedded, highly permeable alluvium.

Near the central and northern LBNL property, two areas show a particularly high density of channels per unit area. These correspond to two east-west trending valleys. The eastern valley is referred to as East Canyon and the central one is Chicken Ranch Canyon. The high density of channels in these valleys appears to be associated with large landslides

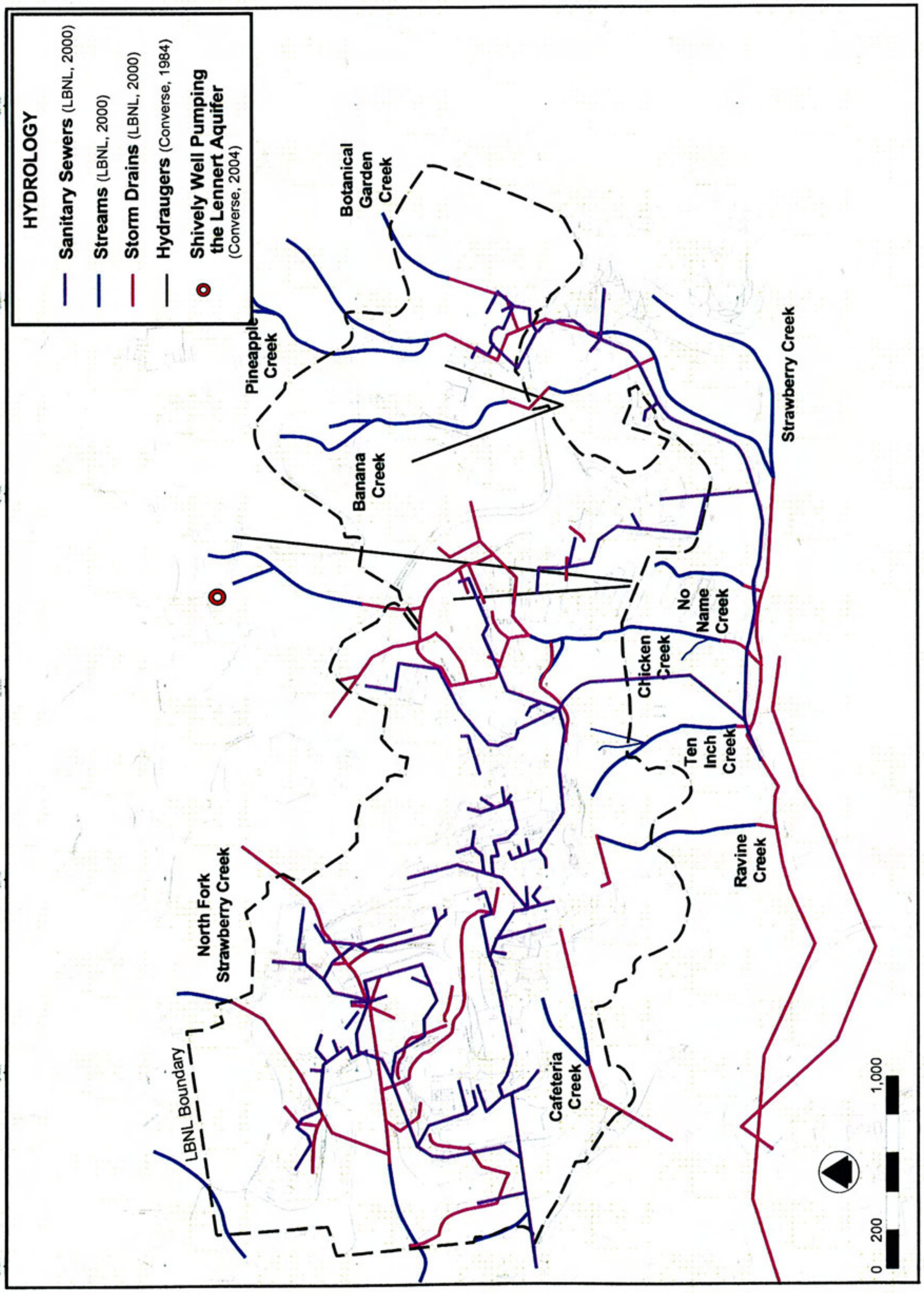

FIGURE 4. MODERN DRAINAGE NETWORK AT LBNL IN STRAWBERRY CANYON

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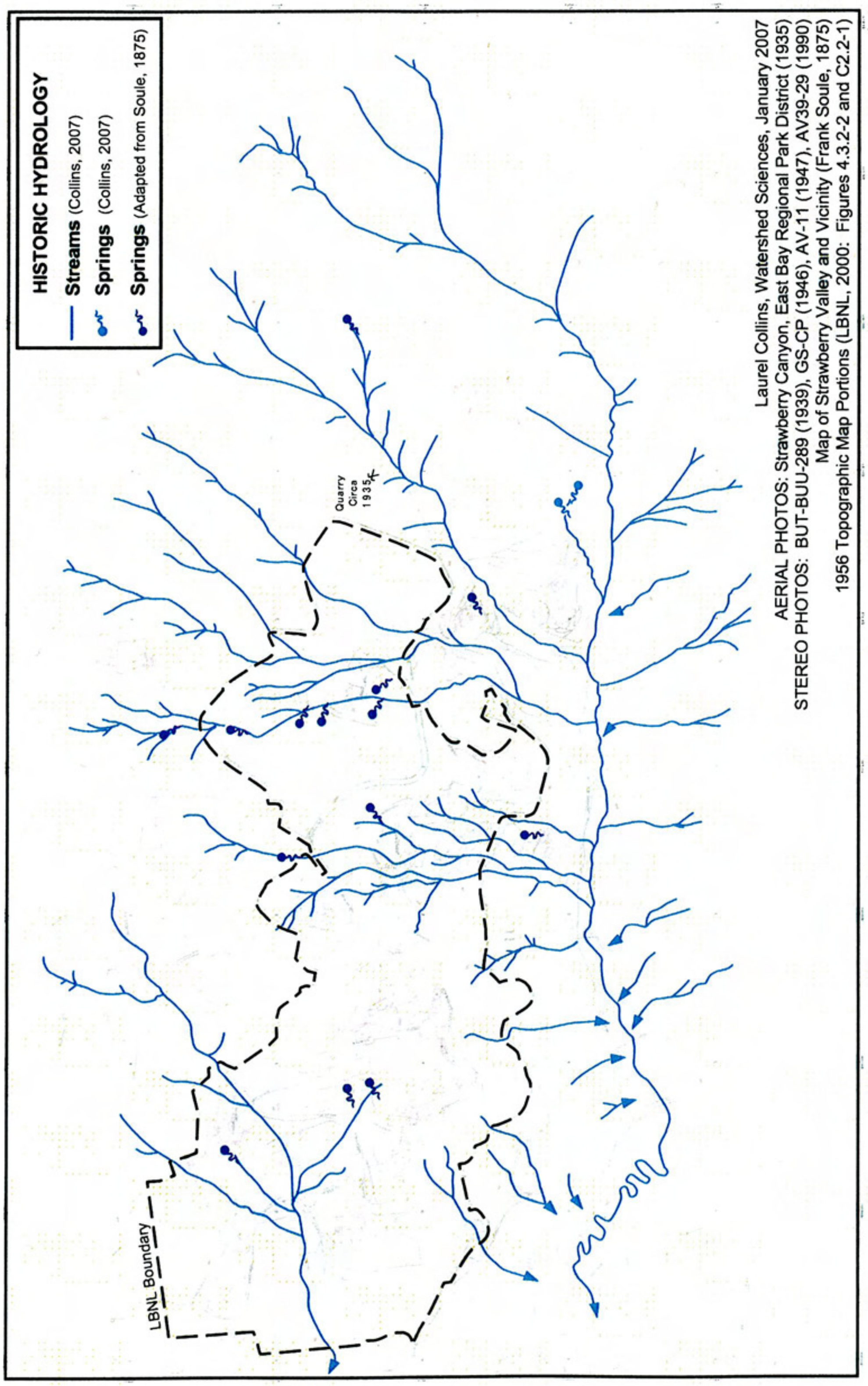

FIGURE 5. INTERPRETATION OF HISTORIC CHANNEL NETWORK AT LBNL IN STRAWBERRY CREEK WATERSHED

CMTW-22 cont.

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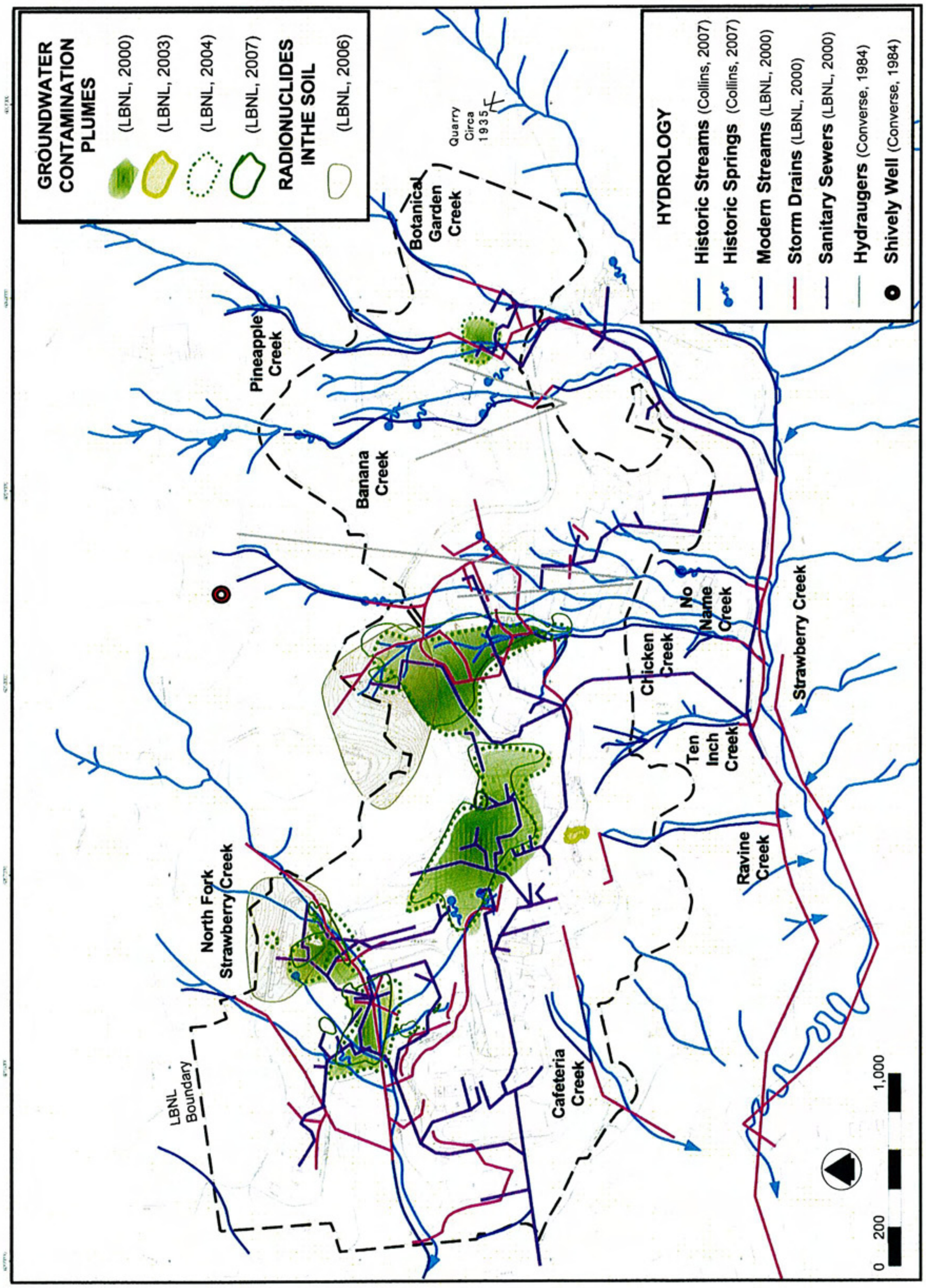

FIGURE 6. GROUNDWATER CONTAMINATION PLUMES IN RELATION TO THE MODERN AND HISTORIC DRAINAGE NETWORKS AT LBNL

CMTW-22 cont.

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that occupy the valley floors (Figure 7a). It is likely that highly erosive soils exist in the valley because they have been mechanically disturbed by both landsliding and faulting. In addition, the clay-rich nature of the soils and landslide deposits in these valleys often leads to slow percolation rates, especially along failure planes of earthflows, which can create perched water tables. These factors contribute to increased runoff per unit area, which leads to increased drainage density.

The historic drainage network helps with interpretation of topographic features such as the landslides in East and Chicken Creek Canyons, but it is also useful for showing movement along fault lines such as the Hayward Fault. At the bottom left corner of Figure 5, over 1200 feet of right lateral channel offset has occurred on Strawberry Creek along the area that is now the UCB stadium. Historic channel mapping is also important for predicting potential migration pathways of contaminant plumes along alluvial soils that might have been buried by large deposits of artificial fill, such as in Blackberry Canyon.

A compilation of the current and historic drainage network relative to the 2000, 2003, 2004, and 2007 LBNL contaminant plume locations is shown in Figure 6. Areas shown in grey indicate the location of radionuclides (tritium and curium 244) in soil (LBNL 2006). All the plumes, except Building 37 VOC plume, are shown to intersect historic drainage channels. Storm drains intersect all contaminant plumes except Building 37. The hydraugers do not appear to intersect plume boundaries, although the Building 74 Diesel Plume is very close to the northernmost hydrauger. The contaminant plumes have a general pattern of downhill convergence into both the historic channel and modern storm drain network.

CMTW-22 cont.

Geologic Bedrock Mapping

The complex geology of Strawberry Canyon involves periods of volcanism, sedimentary deposition within fresh water and marine environments, tectonic uplift, folding, and significant shearing along fault zones that have offset different-aged terrains. LBNL (2000) describes the underlying geologic structure at the lab to be a northeast dipping faulted homocline. Generally, the oldest rocks occupy the lower portions of Strawberry Canyon, while youngest rocks are found toward the east along the ridge.

The middle of the Canyon is more complex with older bedrock formations faulted and offset against younger ones along the Space Science's fault, University fault, New fault, Strawberry Canyon fault, Lawrence Hall of Science fault complex and various un-named faults, as well as the Wildcat and East Canyon Faults. Bedrock of Jurassic to Cretaceous-aged Franciscan Assemblage is mostly to the west of the Hayward Fault, beyond Strawberry Canyon. In this area, these rocks are typically marine sandstones that are faulted against younger bedrock of the Great Valley Sequence along the Hayward Fault at the base of the canyon.

The Cretaceous-aged Great Valley Sequence also has a marine origin. It ranges from mudstone and shale to sandstone with occasional conglomerate. The Great Valley Sequence is in fault contact with the Late to Middle Miocene-aged Claremont and the Late Miocene-aged Orinda Formations in different parts of the Canyon. The Claremont Formation is primarily siliceous chert inter-bedded with shale that formed in a deep marine environment.

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Locally the chert is commonly highly fractured, folded, and faulted. It tends to form erosion resistant outcrops along some ridges.

Conversely, the Orinda is primarily mudstones, sandstones, and minor conglomerates that formed in a non-marine environment. The predominantly clay-rich Orinda shale unit tends to be associated with topographic valleys and is particularly prone to deep-seated landslides. Orinda is stratigraphically overlain and occasionally inter-fingered with the Late Miocene Moraga Formation, which is volcanic in origin and locally tends to be highly fractured, jointed, brecciated, and commonly vesicular (LBNL, 2000). In some places, it has been faulted and offset against the Orinda, especially to the west of the Wildcat Fault.

Although both Orinda and Moraga Formations are highly fractured, the Moraga has hard volcanic flow rocks of andesite and basalt while the Orinda tends to have low strength and hardness. The Moraga Formation is overlain and in contact with the Late Miocene non-marine sedimentary deposits of the Siesta Formation along the northeastern ridgeline. Beyond the ridge, the volcanic rocks of the Late Miocene Bald Peak Formation overlay the Siesta Formation along the axis of a structural syncline (Graymer, 2000).

Figures 7a, 7b, and 7c show interpretations of the geology in Strawberry Canyon that are different. Although the maps also have slightly different spatial extents, they overlap through most of the LBNL property. All maps identify the Orinda, Moraga, and Claremont Formations, yet the location of the bedrock boundaries do not agree. There are also some slight naming differences for the Great Valley Group rocks identified by LBNL and Graymer versus the Panoche Formation identified by Borg. The Panoche Formation simply represents a part of the Great Valley Group and is therefore not a significant difference in interpretation. Dunn (1976) reported that with regard to slope stability, the worst building sites in Strawberry Canyon were along the Orinda, and the Orinda/Moraga contact zones. The principal formations shown to be intersecting the contaminant plume sites are the Orinda and Moraga Formations, Figures 8a and 8b.

CMTW-22 cont.

Figure 8a shows a compilation of the Moraga bedrock contacts as individually mapped by LBNL, Graymer, Collins, and Borg in the respective Figures 7a, 7b, 7c, and 7d. Figure 8b shows a compilation of bedrock contacts of the Orinda Formation. Note that the Building 51L and 61/64 plumes intersect rocks of the Great Valley Sequence. The location of bedrock contacts near the plume sites is particularly important because ground water can travel laterally along the contact zone rather than just move topographically downhill. This is particularly relevant when sharp reductions in permeability occur in the downhill bedrock. Soil permeability and transmissivity are much greater in the Moraga Formation because it has lower clay content than the Orinda.

When groundwater traveling from the Moraga Formation intercepts the Orinda Formation, positive pore pressures can build, forcing water to move along alternative pathways such as along a bedrock contact, through fractures, or toward the surface where it can cause landslides and/or springs. Interpretation of the size of each contaminant plume and its migration is constrained by the array and number of sampling wells. If water laterally.

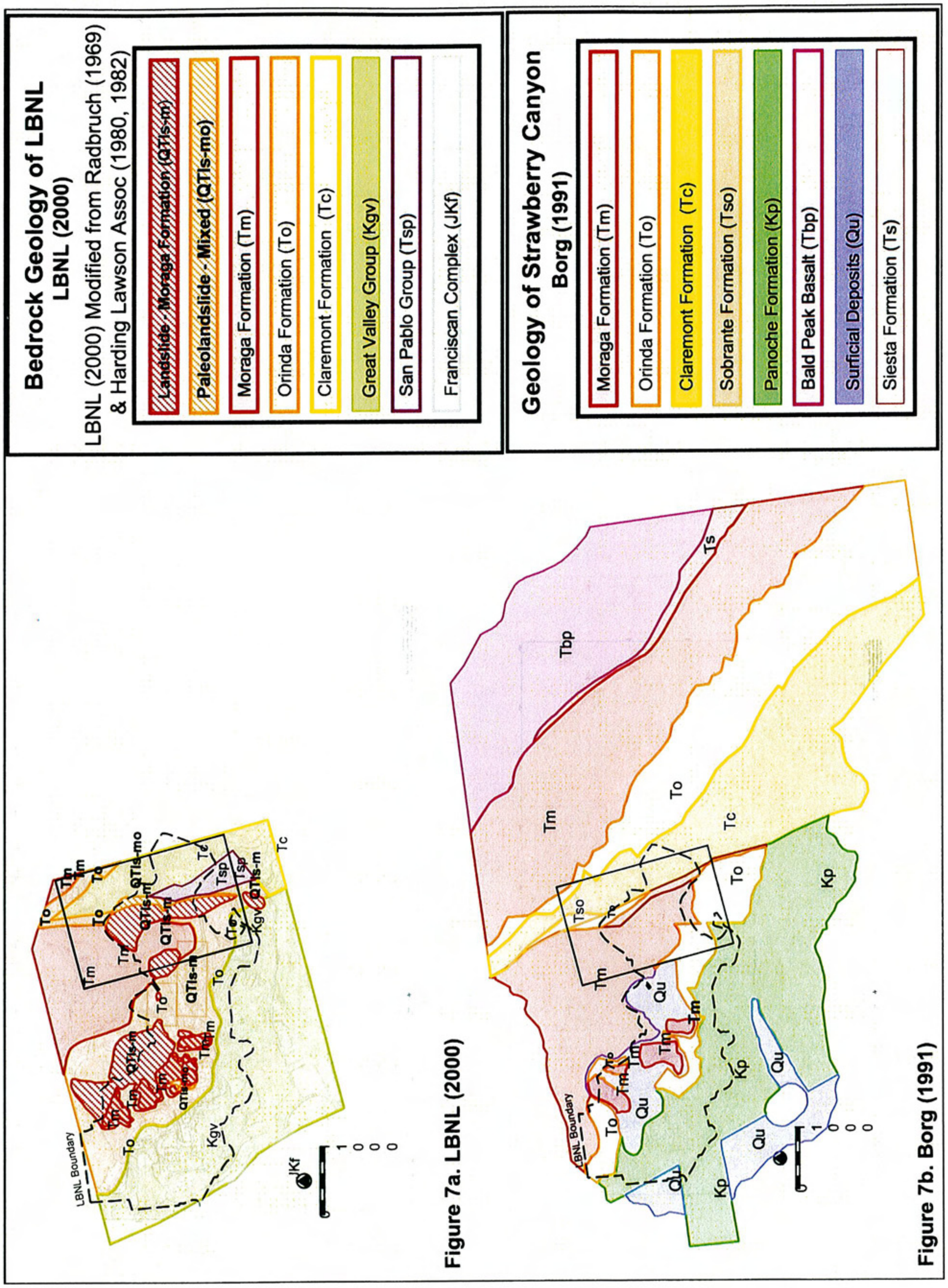

Figure 7a. LBNL (2000)

Figure 7b. Borg (1991)

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cont.

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Geology of the East Canyon and the Proposed Hazardous Waste Handling Facility (Collins 1993)

- Moraga Formation (Tm)
- Orinda Formation (To)
- Claremont Formation - Chert Outcrop (Tc)
- Claremont Formation - Sandstone Outcrop (Tc-ss)
- Claremont Formation - Shale outcrop (Tc - sh)
- Miocene and Upper Eocene Sediments (Tm-e)
- Upper Cretaceous Sediments (Ku)
- Landslides (LBNL Plant Eng, 1981)

Geology in the LBNL Area USGS, Graymer (2000)

- Moraga Formation (Tm)
- Orinda Formation (To)
- Claremont Chert (Tcc)
- Holocene Alluvial Fan (Qhaf)
- Upper Cretaceous Sediments (Ku)
- Jurassic Keratophyre (Jsv)
- Franciscan Complex Sandstone (Kjfs)

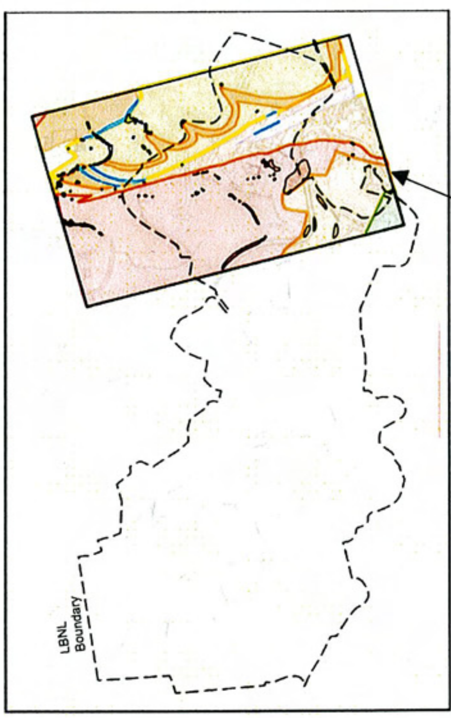

Figure 7c. Collins (1993)

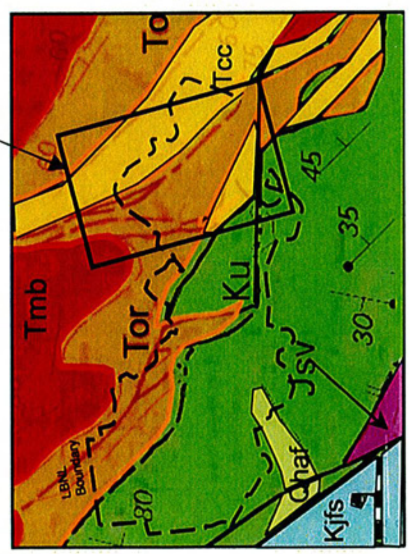

Figure 7d. USGS, Graymer (2000)

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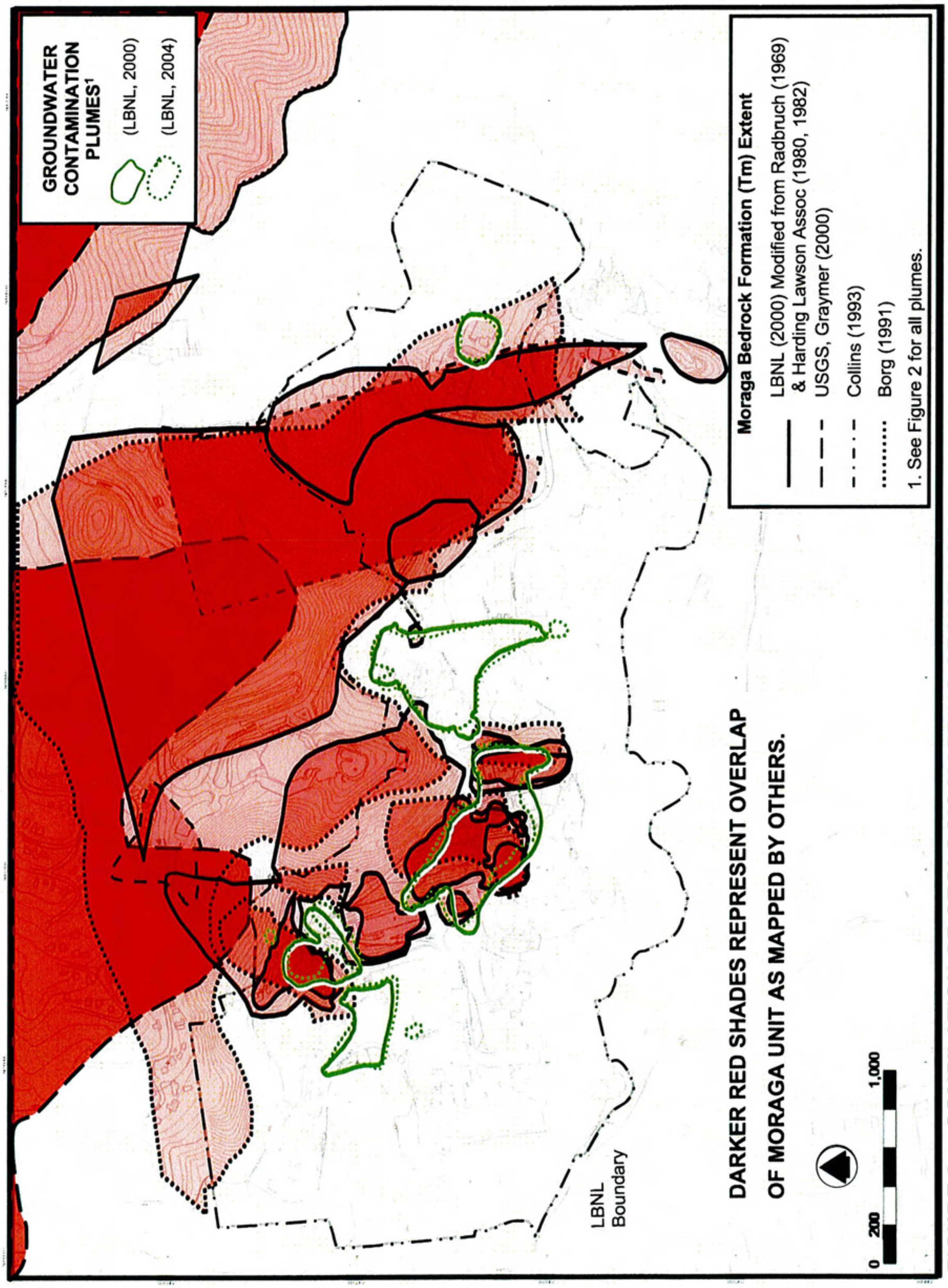

FIGURE 8a. COMPILATION OF GEOLOGIC MAPPING OF MORAGA BEDROCK FORMATION AT LBNL.

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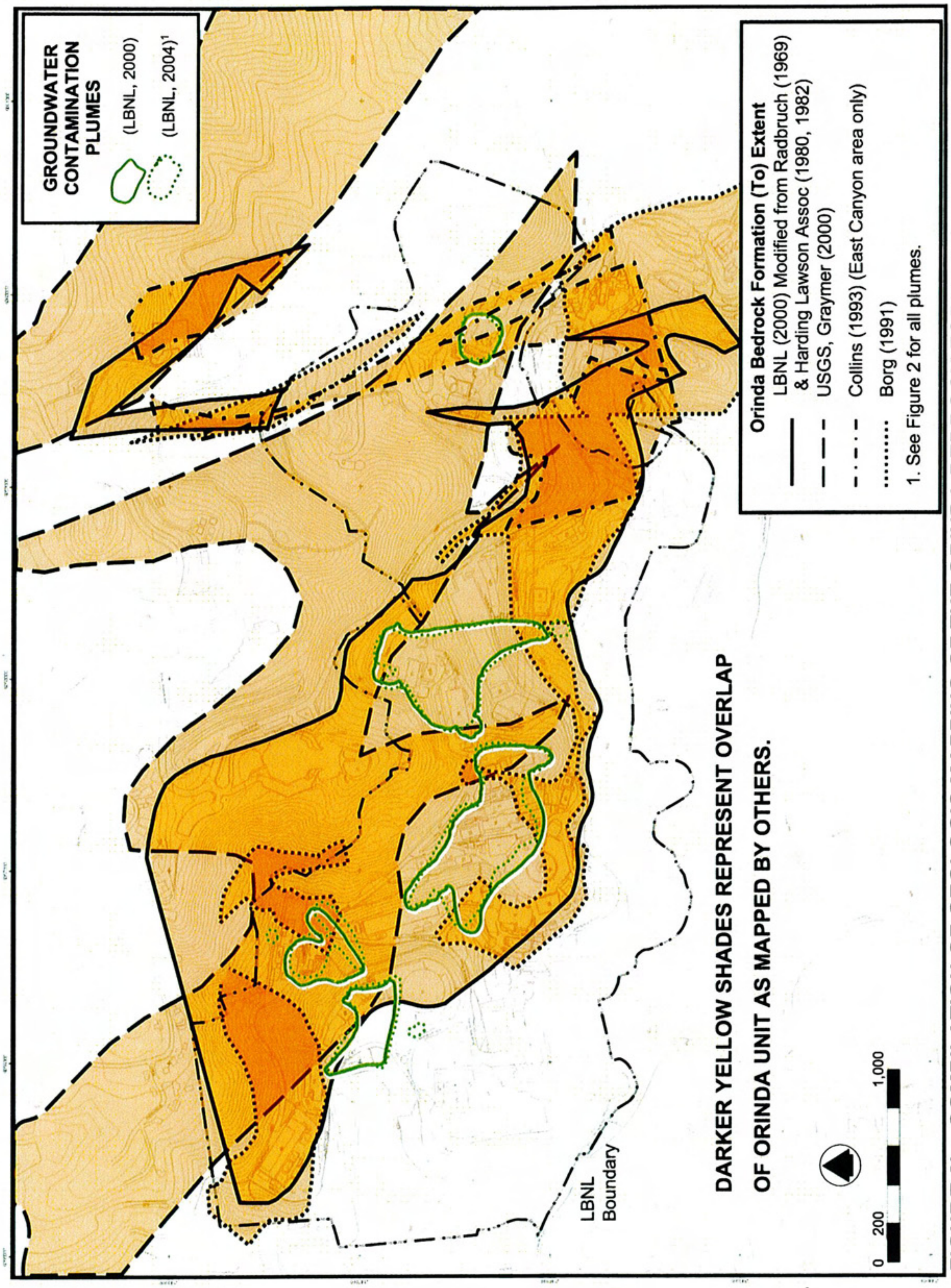

FIGURE 8b. COMPILATION OF GEOLOGIC MAPPING OF THE ORINDA BEDROCK FORMATION AT LBNL

CMTW-22 cont.

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migrates along a bedrock contact and if monitoring wells are not placed in a sufficient array to detect these potential flow pathways, the extent and migration of a plume could be easily misinterpreted. Figure 8a and 8b show substantial differences in the interpretation of the location of the bedrock contacts at nearly every plume site.

During the past 60 years, UCB and LBNL have produced innumerable investigations and geotechnical reports for existing and proposed building sites in Strawberry Canyon. Yet, agreementon the position of faults, landslides, and bedrock contacts has not been consistent among these reports. The lack of continuity among the various reports has been noted by previous researchers who have called for a more comprehensive effort to produce a verifiable picture of landslides and geology (Dunn 1976; Collins, 1993; Collins and Jones, 1994).

For example, in 1976 J. Dunn stated that with regard to instability of hillsides near Buildings 46 and 77, most activity involved failure of material in the Orinda Formation or sliding of the Moraga Volcanics on the Orinda. Although borings had been completed, samples recovered, and tested, he reported that the results and conclusions had not been tied together in a workable package. An earlier report by Collins (1993), recommended that "raw" geological observations such as bedrock outcrops should be shown on future geological investigations and that such maps should be an essential component of an integrated, comprehensive, and computerized database for the LBNL site.

With LBNL producing a GIS-based three-dimensional view of their local geologic interpretations, much has been accomplished since 1993. Yet, a verifiable map showing locations of bedrock outcrops and exposures in excavations remains elusive. Hence, it still remains unclear what information has or has not been used as a foundation for LBNL's geologic map, and why their interpretations differ from reports by their previous consultants

CMTW-22 cont.

Fault Mapping

The Hayward Fault is part of the larger San Andreas Fault system. It is seismically active and falls within the Alquist Priolo Earthquake Fault Zone, Figure 2. Numerous secondary splay faults are also associated with the Hayward Fault, such as the Wildcat and East Canyon Faults that trend northwestward through East Canyon, Figure 9a. As shown in Figures 9b and 9c, these named faults, as well as the Space Science's Fault, University Fault, New Fault, Strawberry Canyon Fault, Lawrence Hall of Science Fault Complex and numerous un-named faults have been mapped by other researchers. Whether or not a fault has been named or identified within the Alquist Priolo Earthquake Zone does not mean that it is not imperative to show it on geologic maps, especially to relate its position to known contamination sites, especially when the information already exists in published reports.

With respect to plume migration, to identify whether a fault is active is not as important as identifying its potential influence on groundwater transport. Without sufficient understanding of fault locations, planning where to place monitoring wells for defining

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and constraining plume boundaries cannot be well founded. Fault mapping is also clearly important for identifying potential hazards to buildings and infrastructure, particularly because splay faults and other faults in close proximity to the Hayward Fault have potential to rupture during large magnitude quakes, especially those emanating nearby.

Figure 10 shows the plume locations and a compilation map of the faults shown by various researchers in Figures 9a, 9b, and 9c. As noted in Figure 10, we call the fault that runs along the Bevatron (Building 51a) and the Advanced Light Source (Building 6) the Cyclotron Fault. The compilation indicates that fault mapping by LBNL does not correspond well with faults mapped by USGS (2007), Converse Consultants (1984), Harding Lawson (1979), or Lennert Associates (1978). Although there is some general agreement about the Hayward, Cyclotron, and Wildcat Faults, there is poor agreement on the existence and location of many of the other faults mapped by others within the LBNL property boundary.

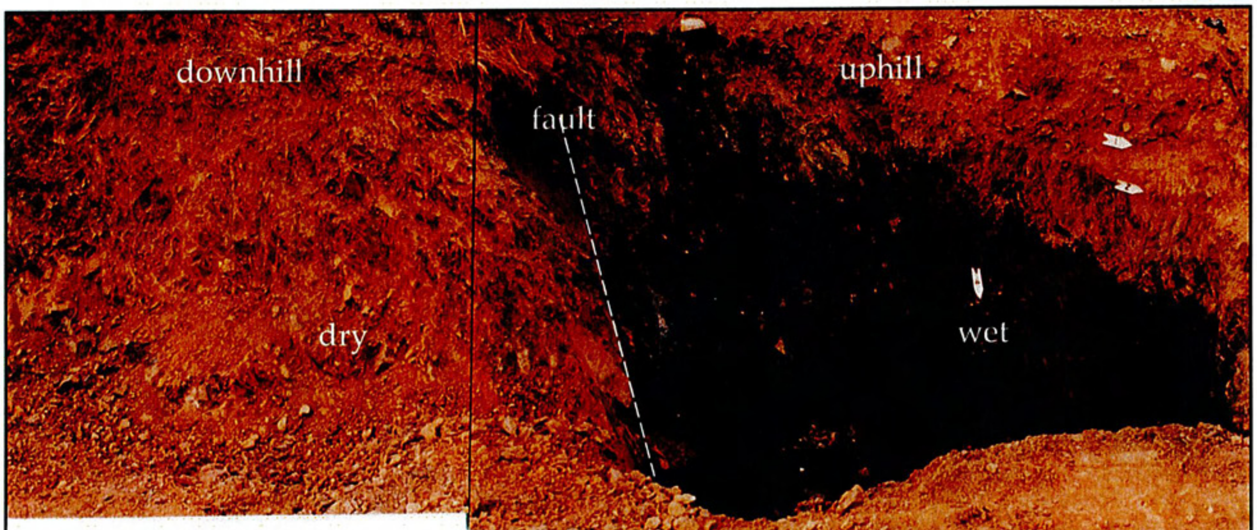

Photo 1. A nearly vertical fault in the Berkeley hills is impeding downhill transport of groundwater, causing it to flow laterally along the fault trace. Water is collecting in a pool at the base of the wet side of the excavation.

CMTW-22 cont.

During grading operations for the construction of the new LBNL Hazardous Waste Handling Facility and throughout many new excavations in the Berkeley hills, conducted during the 1993 Oakland Hills post-fire reconstruction, Collins and Jones (1994) stated that they made numerous observations of faults exerting strong control on groundwater movement and swale development. Photo 1 shows an example of one of the sites they observed in the Berkeley Hills where groundwater flow moved laterally along a fault plane that impeded downslope groundwater transport. They also observed that the location of crown scarps of several recently active earthflows in the Berkeley Hills corresponded to the location of fault traces. They suggested that fault traces in many areas of the Berkeley Hills are masked by younger deposits of sediment from landslides and streams.

It is important to consider that when excavations expose faults or when utility trenches intersect faults that also intersect contaminated groundwater, the excavations or trenches can become additional avenues for contaminant plume migration. Also important to consider is that zones of varying permeabilities in clay-rich fault gouge can provide traps and pathways for moving water, and in some cases, the traps can build enough pressure to initiate landslides and potentially convert the subsurface flow to surface flow.

Potential problems associated with the lack of definitive geologic mapping in Strawberry Canyon are increased by the proximity of the active Hayward Fault and related seismicity. According to Steinbrugge, et al, (1987) the maximum magnitude earthquake anticipated is 7.5, which has the potential of causing right-lateral horizontal offsets that could average 5 feet along the Hayward Fault. Hoexter (1992) reported that there was potential for secondary or splay faults in the East Bay to have triggered slip from quakes generated along the primary Hayward Fault. Wildcat Fault appears to be a likely splay from the Hayward Fault. Hoexter's survey of historical earthquakes indicated that triggered slip on splays have movement that is usually less than 20% of the primary offset. This suggests that 1.5 feet of horizontal offset on a splay fault from the Hayward Fault could be anticipated if the maximum magnitude quake occurred. Hoexter also reported that vertical displacements could accompany horizontal slip, although a much smaller percentage of total movement would be expected. Such projections of horizontal and vertical offsets along secondary faults should be sufficient to warrant more detailed mapping of fault patterns within Strawberry Canyon.

We believe that sufficient information is not available from the literature to confidently determine the activity status of the numerous faults that exist along the Wildcat Fault shear zone, which may be as much as 600 feet wide and includes the East Canyon Fault (Collins, 1993). Published USGS maps in this report are not of adequate detail or scale to delineate all the bedrock complexity of Strawberry Canyon, yet more detail is shown by USGS than that which LBNL represented on their Bedrock Geology Map, provided in their investigative RFI report (LBNL, 2000). This is perplexing because much geologic complexity has been demonstrated in previous reports and investigations conducted by LBNL's own geotechnical consultants. For example, Figure 11 shows a compilation map detail of faults mapped by various consultants and researchers for just the East Canyon (Collins, 1993). Figure 11 demonstrates general agreement that the Wildcat Fault exists, but poor agreement on its location or number of traces within its shear zone. This site is important because it is the location of the diesel fuel plume near Building 74, and is the proposed location for new buildings in the East Canyon described in the recent LBNL LRDP Report (2007). **CMTW-22 cont.**

During the grading operations for the LBNL Hazardous Waste Handling Facility (Building 85), numerous northwest and east-west trending faults were exposed near the Wildcat Fault shear zone northwest of LBNL Building 74. So many faults were intersected that it brought into question whether the previous 1980 Harding Lawson report by Korbay and Lewis, called the Wildcat Fault Investigation (performed for Building 74), was actually sufficient to evaluate the Wildcat shear zone. The trench was located more than 1000 feet north of Building 74 and inconsistencies within the trench logs confounded interpretation of vertical displacements at the fault trace (Collins, 1993). Further concern arises about the activity status of Wildcat Fault because according to King (1984) and verbal communication from Curtis (1993), a disagreement occurred at the trench site between investigators Steve Korbay of Harding Lawson Associates and Dr. Garniss Curtis of UCB Department of Earth and Planetary Science. Curtis believed there was sufficient evidence in the trench site to designate the Wildcat Fault active, while Korbay did not.

LBNL does not show the Wildcat Fault as active (LBNL, 2000) and we are not presently aware of any additional trench investigations that have been conducted on the Wildcat Fault since 1980. Additional lines of evidence concerning fault activity in Strawberry Canyon, however, can be gleaned from maps showing the epicenters of local seismicity. In Figure 12a, we compiled the fault mapping by others from Figures 9a, 9b, and 9c and overlaid the epicenters of seismic events that have occurred in the Strawberry Canyon during the last 40 years. Over 57 earthquakes with Richter Magnitude between 1.8 and 3.0 have occurred in Strawberry Canyon. Such a high incidence of microseismicity within the mapped traces of Wildcat Fault and between the Wildcat and the Cyclotron Faults provides compelling evidence that additional faults other than just the Hayward should be considered as active in Strawberry Canyon. Indeed, recently during March 2007 two small earthquakes, magnitude 2.0 and 1.4, shook the Canyon along an un-named fault and the Hayward Fault, respectively (http://quake.wr.usgs.gov/recenteqs/).

During the 1991 excavation for Building 84 in the East Canyon, Collins, Jones, and Curtis observed bedrock contacts and numerous fault exposures in the excavated bedrock at the building site. Of particular significance was the discovery of an entire geologic bedrock unit, the Briones Formation, which had never before been mapped in Strawberry Canyon. The Briones outcrop, which was full of marine shell fragments, was interpreted as a tectonic block that has been dragged along the Wildcat Fault during the last 10 million years. Its displacement might exceed 9 miles, which is twice the amount previously considered possible along this fault (personal communication Dr. D. Jones, UCB Department of Earth and Planetary Science).

CMTW-22 cont.

Pat Williams (former LBNL staff Scientist Earth Sciences Division) speculated that a structural connection might exist between the active Hayward and Pinole Faults, and that the linkage might be associated with the Wildcat Fault (personal communication, 1992). Bishop (1973) documented evidence of active creep along the Wildcat Fault north of El Cerrito. During a 1971 survey of the East Bay Municipal Utility District water tunnel (between San Pablo Reservoir and the Kensington Filtration plant), vertical and right lateral displacements were documented near the Wildcat Fault shear zone. Taylor (1992) reports that the pattern of fault creep observed in the Montclair area (south of Berkeley) and elsewhere along the Hayward fault indicates that the broad fault zone might contain more than one Holocene active fault trace.

During the winter of 1992, another subsurface trench investigation was conducted on the East Canyon Fault. It was performed by Geo Resource Consultants and LBNL staff for LBNL. Evidence of both vertical and horizontal offset was discovered. This dual type of motion is probably typical for faults in the Canyon. Jones and Brabb (1992) suggest that significant displacement has occurred across the Berkeley Hills from combined strike-slip and thrust movements. Jones (1992) reports that most of the major strike-slip faults in the

FIGURE 9. SELECTED EXAMPLES OF FAULT MAPPING STUDIES AT LBNL IN STRAWBERRY CANYON

FAULTS

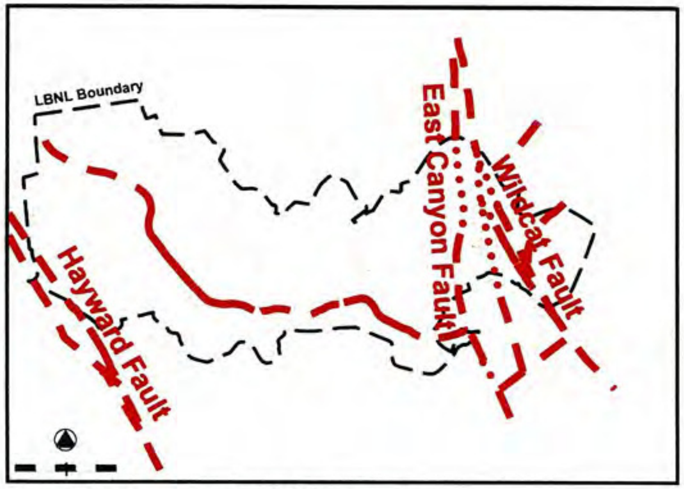

FIGURE 9a. LBNL (2000) Based on: Harding-Lawson (1980, 1982), Radbruch (1969)

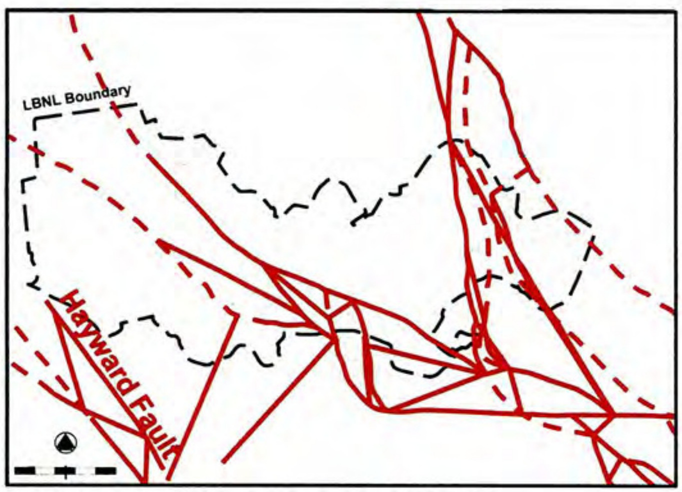

FIGURE 9b. USGS on Google Earth (2007)

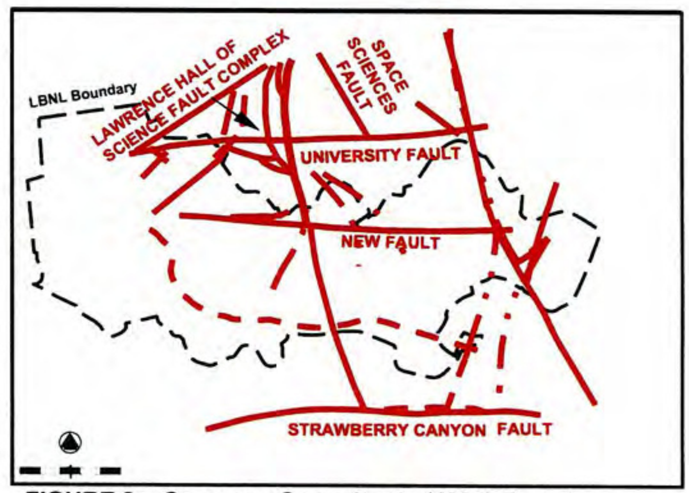

FIGURE 9c. Converse Consultants (1984) Based on: Harding-Lawson (1979), Lennert & Associates (1978) (Mapping does not include western portion of LBNL.)

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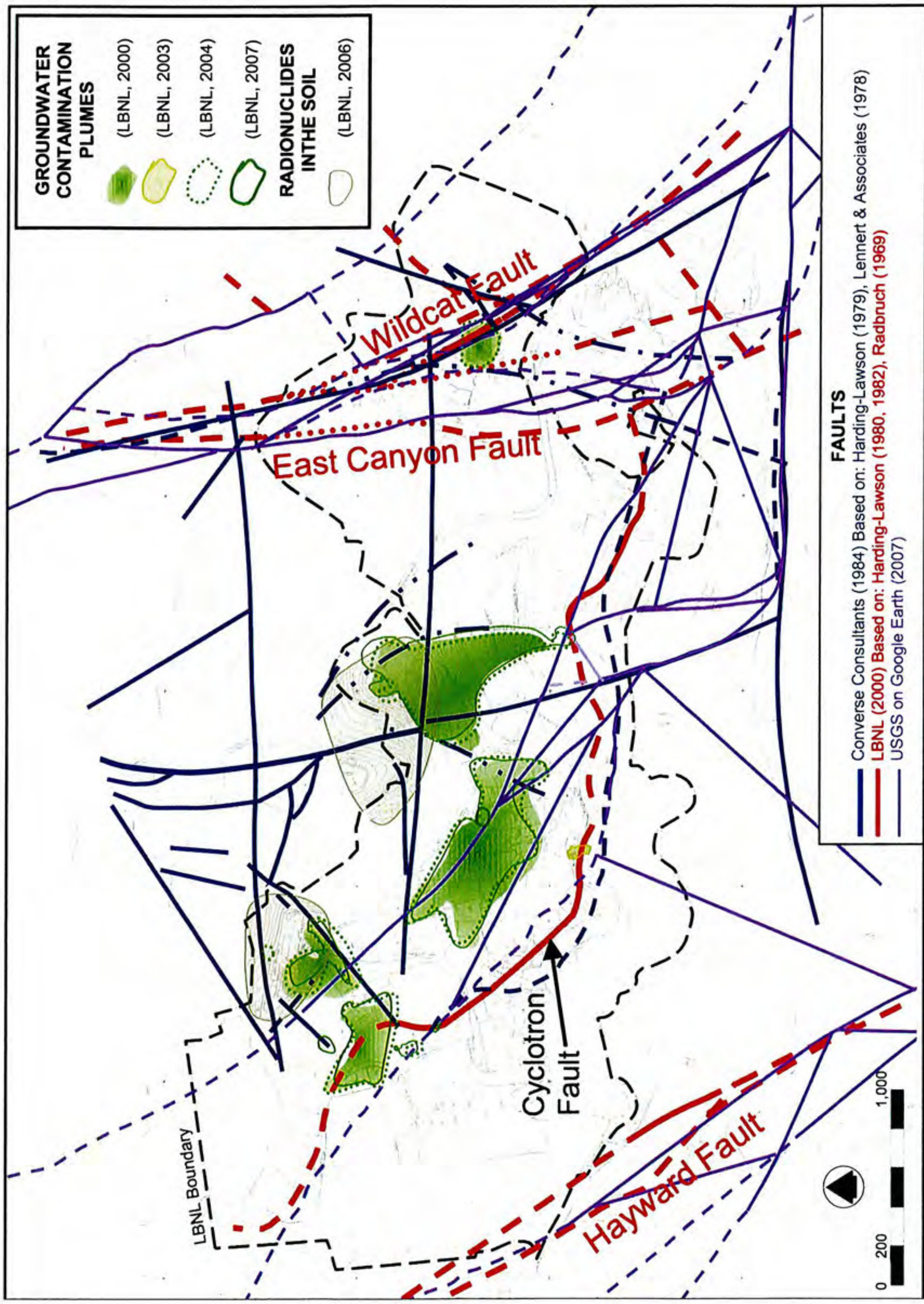

FIGURE 10. COMPILATION OF FAULT MAPPING AT LBNL IN STRAWBERRY CANYON RELATIVE TO SOIL AND GROUNDWATER CONTAMINANT PLUMES.

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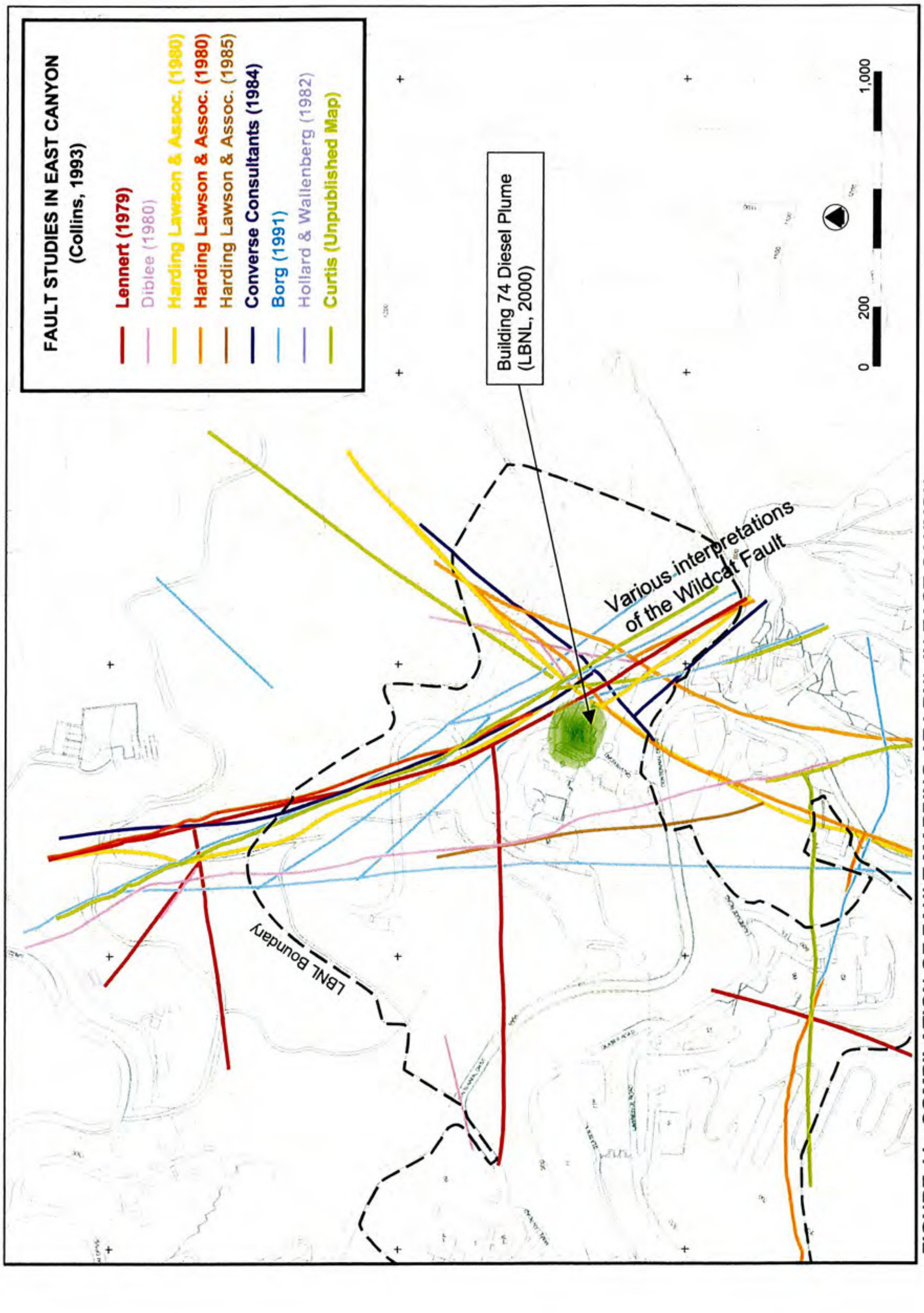

FIGURE 11. COMPILATION OF FAULT MAPPING AT LBNL IN EAST CANYON

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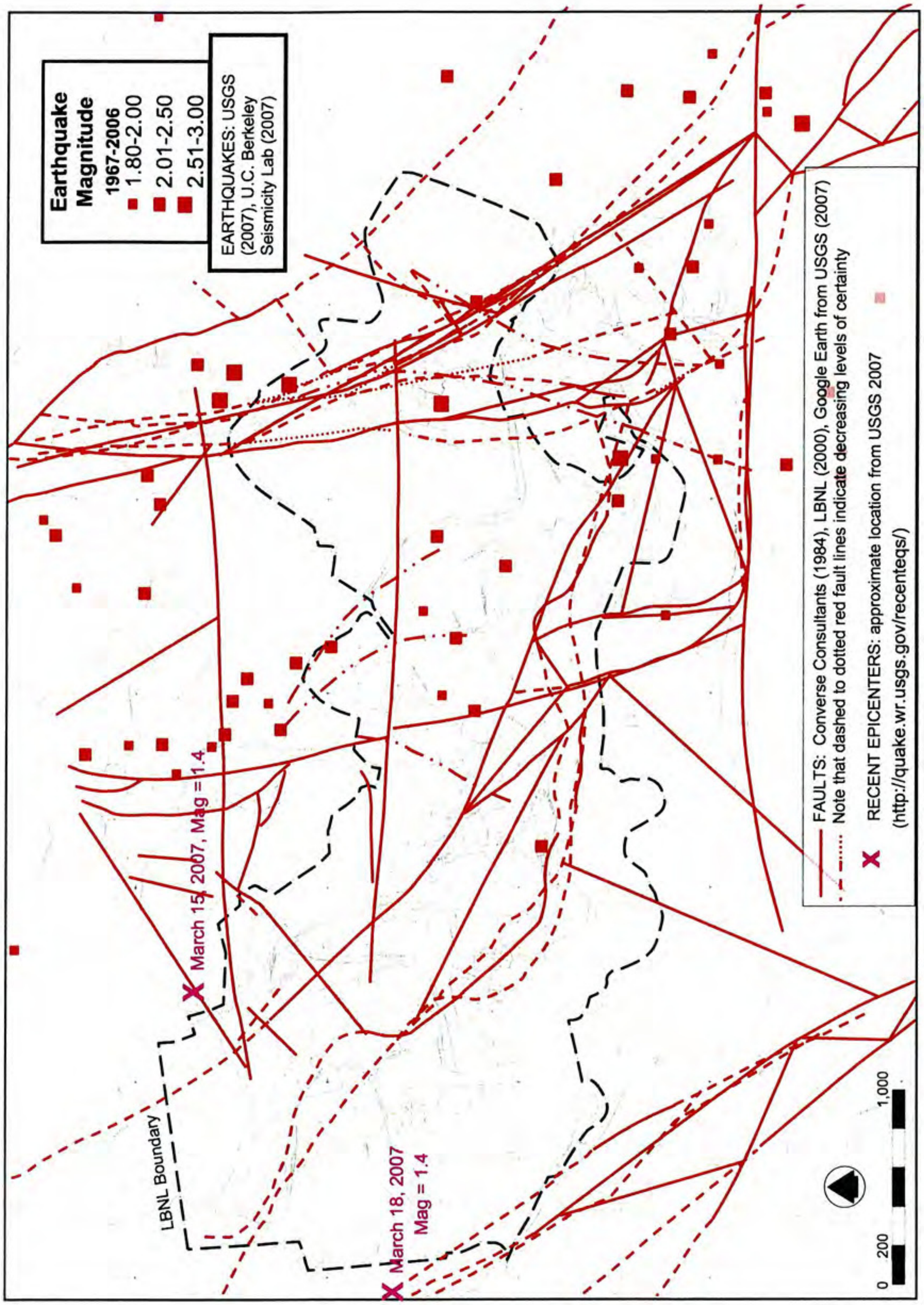

FIGURE 12a. EARTHQUAKE EPICENTERS AND FAULT COMPILATION AT LBNL IN STRAWBERRY CANYON 1967 - 2007

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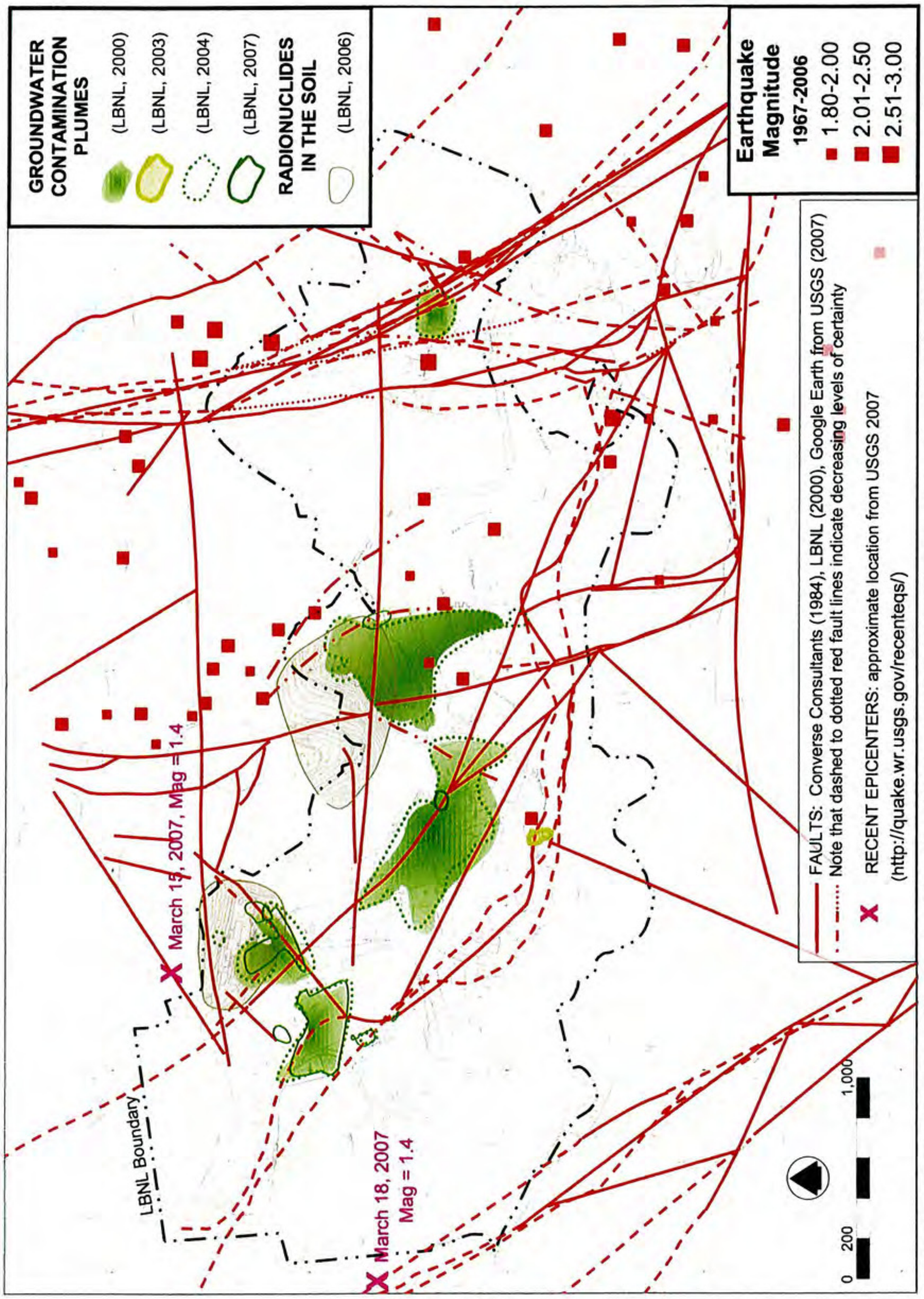

FIGURE 12b. GROUNDWATER CONTAMINATION PLUMES AND RADIOACTIVE CONTAMINATION IN SOIL RELATIVE TO FAULTS AND EARTHQUAKE EPICENTERS AT LBNL IN STRAWBERRY CANYON

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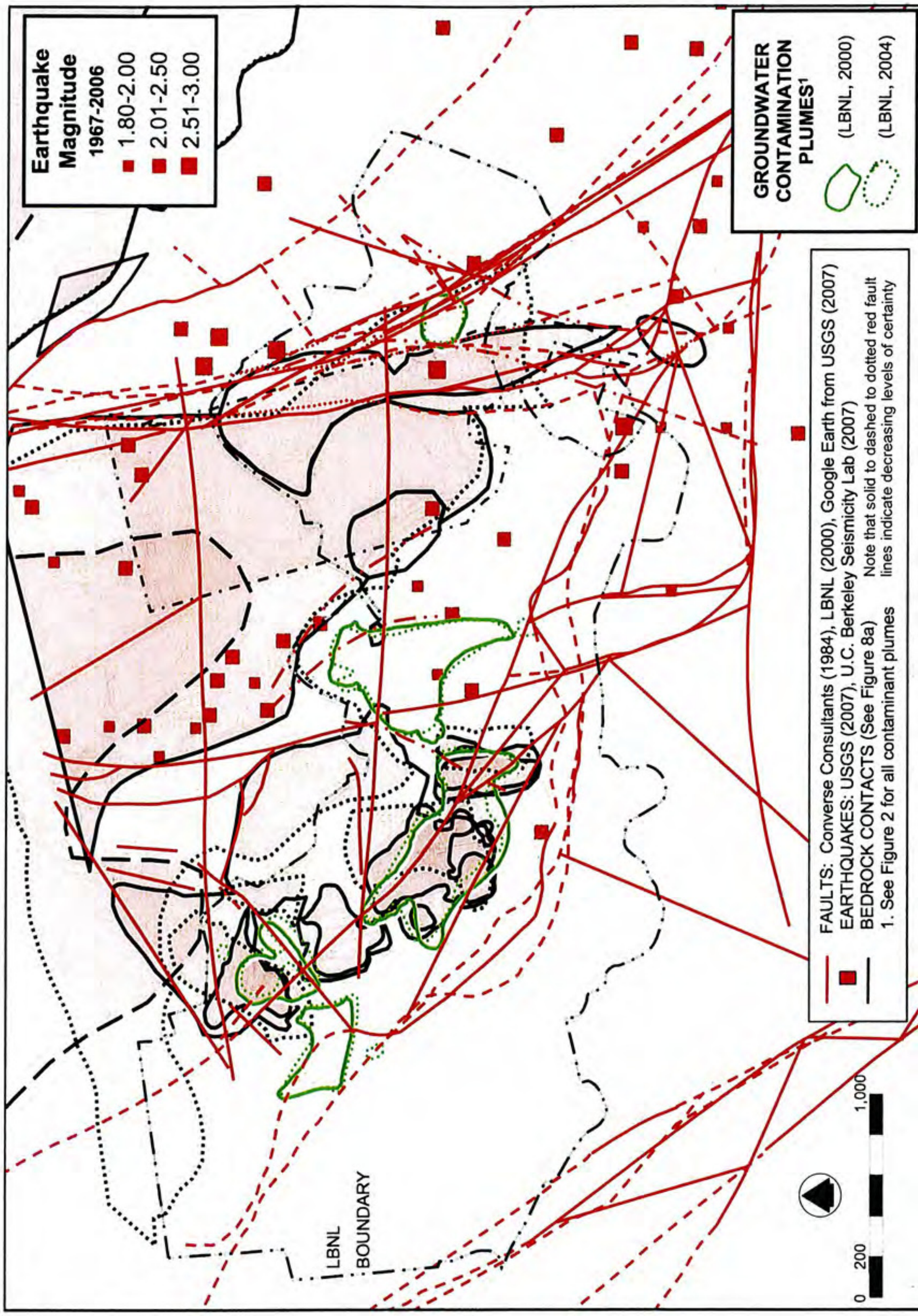

FIGURE 12c. COMPILATION OF GEOLOGIC MAPPING OF THE MORAGA BEDROCK FORMATION AND FAULTS IN RELATION TO CONTAMINANT PLUMES AT LBNL IN STRAWBERRY CANYON

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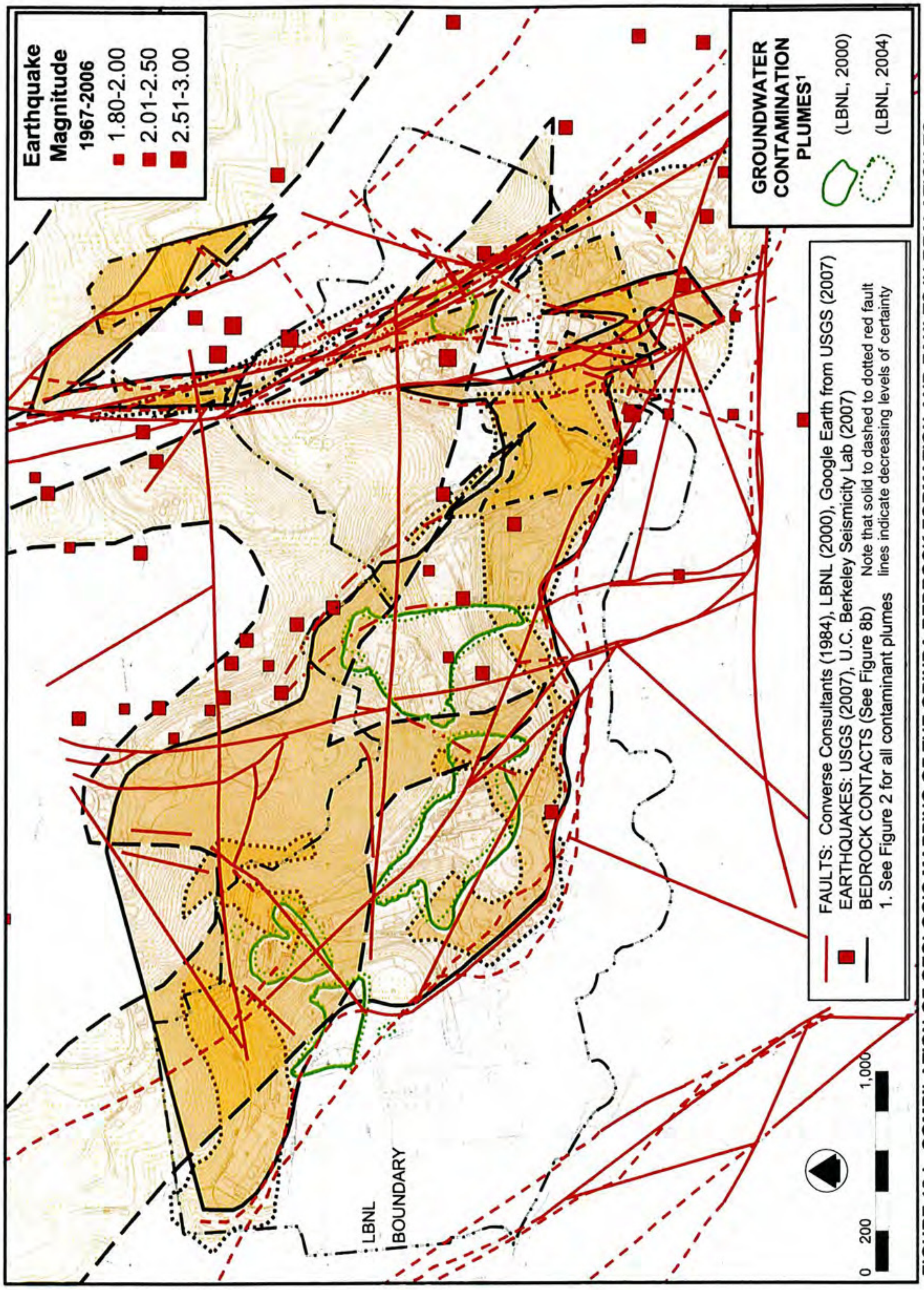

FIGURE 12d. COMPILATION OF GEOLOGIC MAPPING OF THE ORINDA BEDROCK FORMATION AND FAULTS IN REALATION TO CONTAMINANT PLUMES AT LBNL IN STRAWBERRY CANYON

CMTW-22 cont.

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Coast Ranges have attendant parallel thrust faults rooted within primary strike slip faults. In particular, Jones' geometric model of kinematics and stress transfer through the crust indicates that many thrust faults are still active within the Bay Area. The implication of these findings is that more consideration should be given to assessing risks posed byvertical displacements of faults, as well as horizontal offsets. Faults with a principal component of vertical motion have been mapped by LBNL (2000) and others (USGS, 2007; Converse Consultants, 1984; Harding Lawson, 1979; and Lennert Associates, 1978), but little is known about their potential for thrust or down-dropping movements.

In Figure 12b, the location of the various faults shown previously in Figure 12a is shown relative to contaminant plume sites. As can be seen, every plume intersects at least one fault that has been mapped by either LBNL, its consultants, or by USGS (Figures 9a, 9b, 9c). When fault locations and the different bedrock contacts are shown in combination with the contaminant plume locations, as in Figures 12c and 12d, a complex picture emerges, showing that numerous influences could be affecting groundwater transport and contaminant plume migration. In the latter two figures, it can be seen that faults and bedrock contacts do not necessarily coincide. If the complexity of geologic conditions at the contaminant plume sites is oversimplified, the extent and potential contaminant dispersement could be underestimated because monitoring wells were not placed at key positions along fault lines.

Landslide Mapping

Deep-seated and shallow landslides occur throughout the Berkeley Hills including Strawberry Canyon. Both artificial and natural mechanisms have contributed to increased rates of landslide activity in many areas. Land use activities in the hills can decrease slope stability by the action of grading large cuts or filling deep canyons to create flat areas for roads and buildings. Such grading operations interrupt surface and subsurface flow, and create impervious surfaces that increase runoff. The cuts remove lateral hillside support and convert groundwater flow to surface flow. The fills can increase the loading of a hillside and can increase or decrease groundwater saturation depending upon whether they are capped by an impervious surface and whether they are properly drained.

CMTW-22 cont.

Triggers for initiating landslide movement can be artificial or natural. The natural triggering mechanisms can include intense or prolonged rainfall, greater than normal seasonal rainfall, earthquakes, or changes in mass balance from other landslides. Artificial triggers can include concentrated runoff from roads and other impervious surfaces, increased saturation from drain blockages, removal of root strength by deforestation, removal of lateral slope support, and increased loading of pre-existing slides by added weight of artificial fill.

Several landslide maps of Strawberry Canyon have been produced by different researchers, as shown in Figures 13a through 13f. All maps show that numerous landslides have been mapped within the LBNL boundary, yet not all researchers agree on location, size, or types of landslides. Nor do all maps necessarily depict the same comparable landslide category. For example, some maps show colluvial deposits and some show colluvial hollows as source areas for shallow slides and/or landslide scars, for example Figure 13b versus Figure 13c.

Additionally, some maps group colluvium with fill, such as Figures 13a and 13b. Nonetheless, we expect that the brown polygons on map Figures 13a through 13e and the brown and purple ones in map Figure 13f all represent shallow to deep-seated landslide failures. Using historical and recent aerial photographs, the landslide features in Figure 13f were specifically mapped for this project and the slides therefore, are mapped relative to the historical topography and channel network as per Figure 5.

Figure 14 shows a compilation of the contaminant plumes with all the landslides and surficial mapping shown in Figure 13a-13f. The compilation shows general agreement about the existence of large landslides in Chicken Creek basin and East Canyon but the boundaries of individual landslides have poor overlap. Because Figure 14 becomes overwhelmed by landslide features that cover more than 50% of the LBNL property, it is too difficult to read the numerous overlapping polygons. We have therefore reduced the number of map overlays in Figure 15 to just three interpretations, Nielsen, LBNL, and Collins (Figures 13a, 13b, and 13f.) We also eliminated the fill and colluvium shown in Figure 14, along mainstream Strawberry Creek that was mapped by Nielson and LBNL near of the UCB Memorial stadium in the southwest corner of the map.

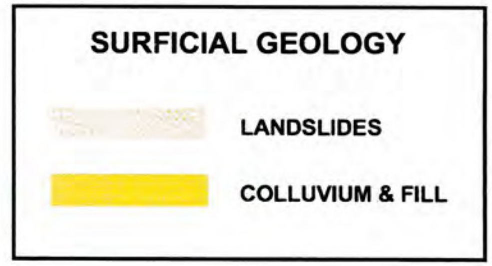
Figures 14 and 15 indicate that all the contaminant plumes either lie fully within or intersect the boundaries of landslides. This means that in addition to the complexities already demonstrated by bedrock contacts and faults intersecting the plume boundaries, there is also high probability that landslide failure planes could further influence groundwater movement. Moreover, the developing picture of complexity signifies that groundwater can transfer along any number of pathways (bedrock contacts, faults and landslide failure planes) and in any order of combination. In addition, future interpretation of contaminant plume migration could be complicated by continued earthflow creep movement or significant surges in slide activity.

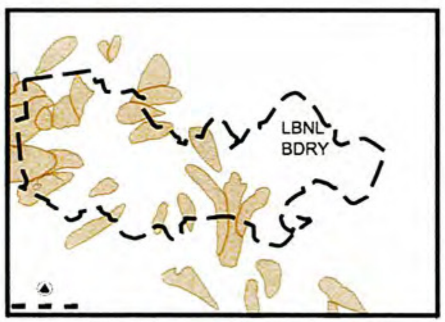
CMTW-22 cont.

The deep-seated slides in Strawberry Canyon, shown in Figure 13e and 15, in most cases tend to be slumps, earthflow, or complex earthflows that can involve movement of large intact blocks of bedrock and extend from ridge top to valley bottom. The complex slides can be characterized by multiple failure planes and zones of stability and instability that change after the mass balance is altered by renewed activity or by man-made changes during grading operations. In many cases, there is rotational movement near the crown scarp and the entire mass can slowly creep or move in sudden surges. These kinds of slides are often associated with clay-rich earth or bedrock. Perched water tables at the rotated head of the deposit can be common. Similarly, springs can typically be found where the failure plane near the toe of the slide verges toward the ground surface and converts its subsurface flow to overland flow. If contaminant plumes intersect landslides and travel along landslide failure planes, surface waters within seep gullies on the landslide or at the toe of the slide could also be at risk of contamination.

13a. Tor Nielsen, 1975 (USGS)

13b. LBNL, 2000





13c. Unpublished, Received from Kropp Assoc. (no author or date).

13d. Unpublished, Received from Kropp Assoc. (no author or date).

13e. California Geological Survey, 2003

FIGURES 13a-13e. MAPS OF LANDSLIDE STUDIES AND SURFICIAL DEPOSITS GEOLOGY

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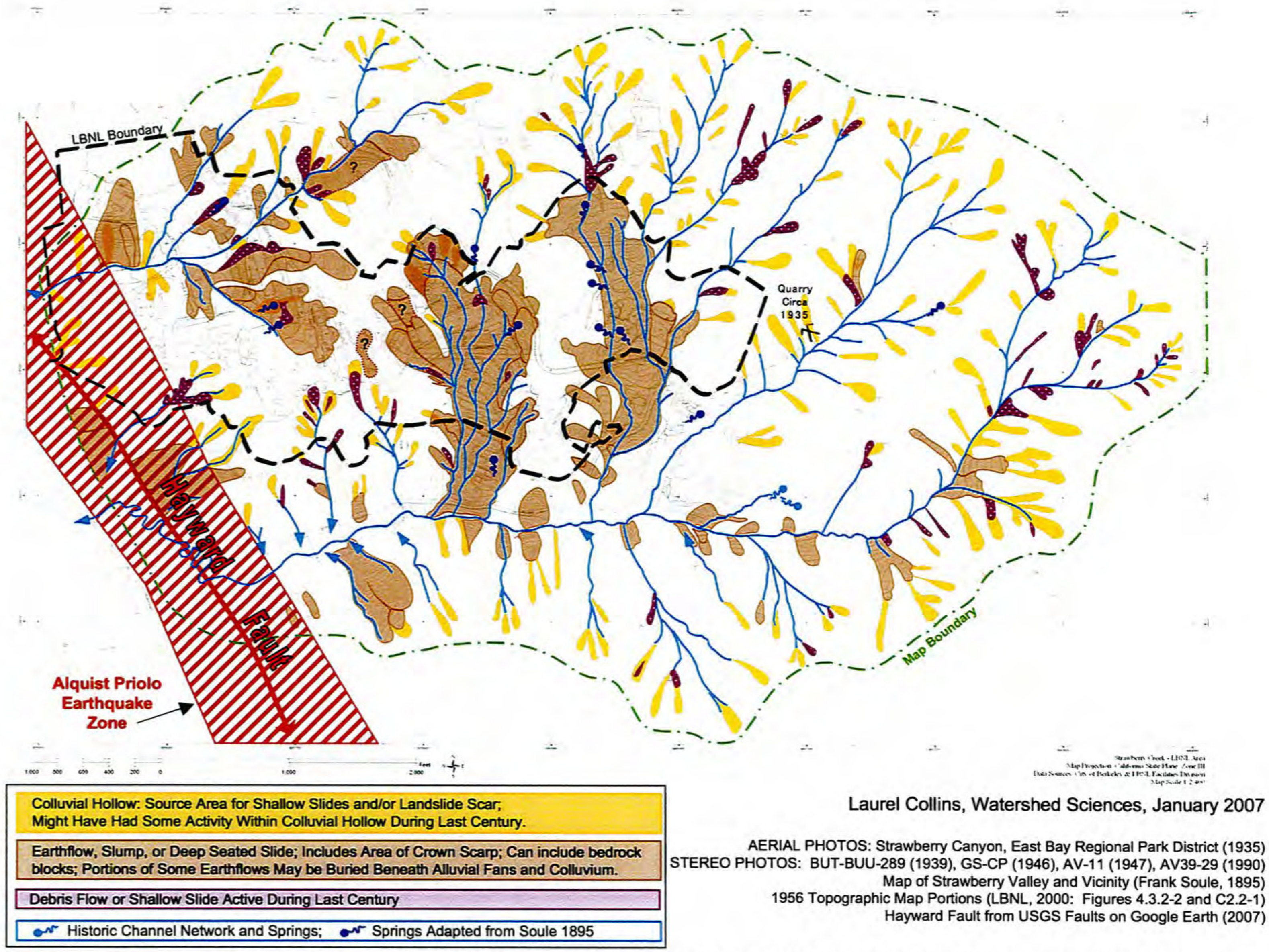

FIGURE 13f. INTERPRETATION OF HISTORIC CHANNEL AND LANDSLIDE NETWORK AT LBNL IN STRAWBERRY CANYON

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cont.

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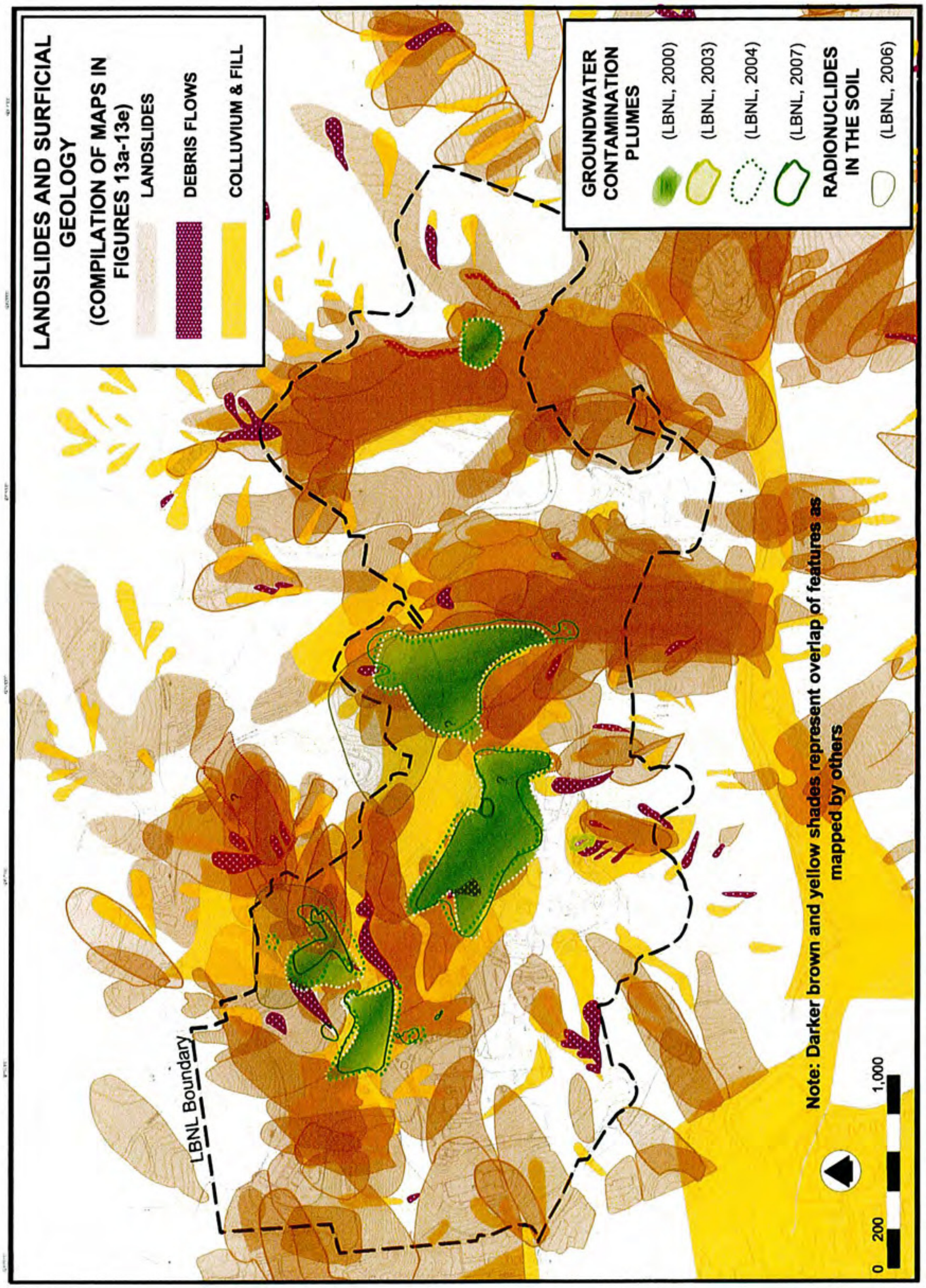

FIGURE 14. COMPILATION OF LANDSLIDE AND SURFICIAL GEOLOGY MAPS 13a-13f IN STRAWBERRY CANYON

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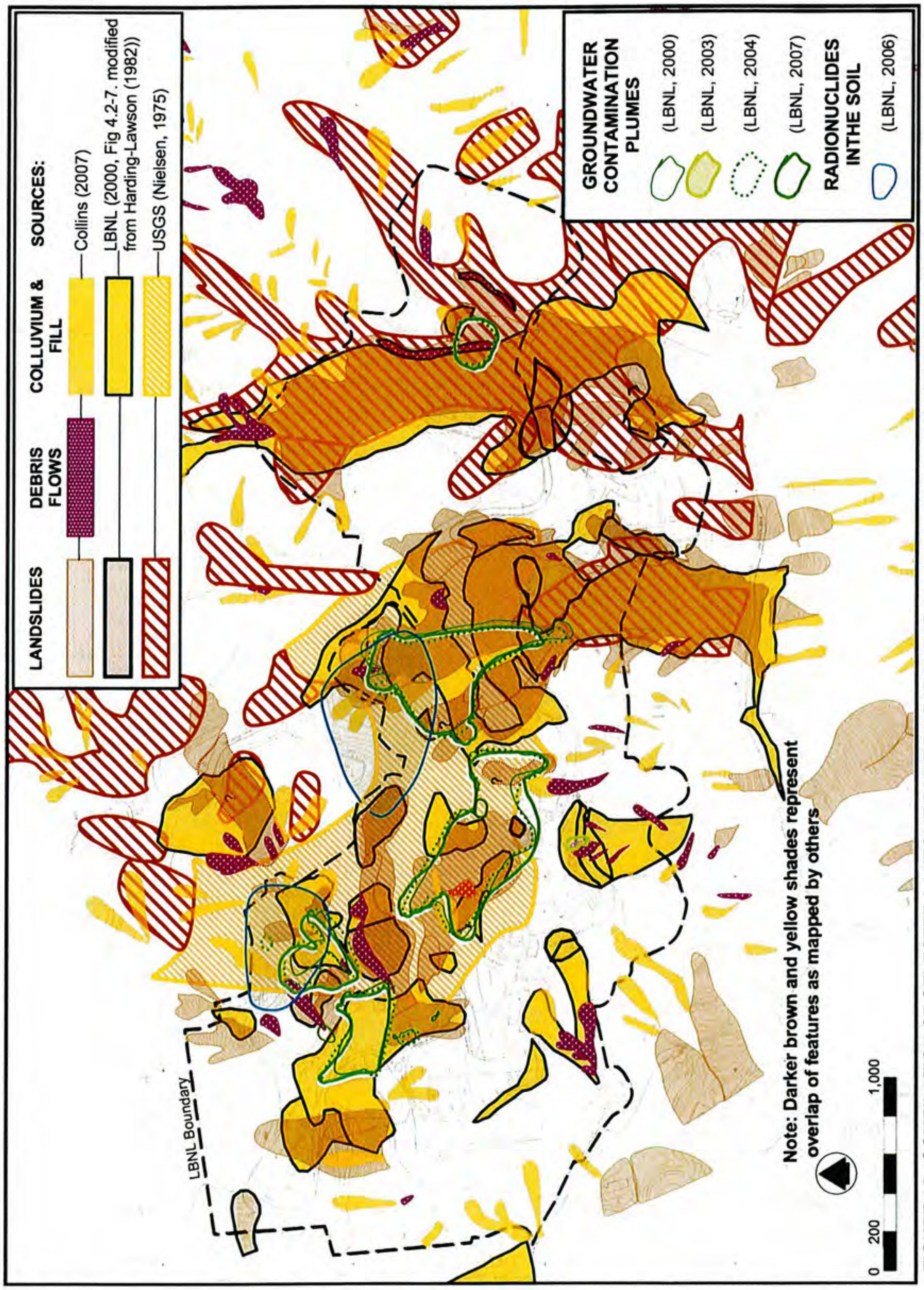

FIGURE 15. COMPILATION OF SELECTED LANDSLIDE MAPPING (FIGURES 13a,13b,13e) IN STRAWBERRY CANYON IN RELATION TO GROUNDWATER CONTAMINATION PLUMES

CMTW-22 cont.

Shallow landslides in Strawberry Canyon, shown in Figures 13e and 15, tend to be soil slips, debris slides, and debris flows, which typically occur on steep slopes and move typically at high rates of speed. They tend to be translational in movement and are often associated with soils or bedrock that is porous and not necessarily clay-rich. They often occur within colluvium-filled hollows. The debris flows can form alluvial fans at the base of their run-out pathways.

The head of East Canyon appears to have numerous alluvial fan deposits that might be overlaying a deep-seated earthflow within the Orinda Formation. The earthflow might be overlaying or obscuring fault traces. Alternatively, the earthflow might have been sheered by fault displacement. Interpretation of earthflow shear planes versus fault planes at the Wildcat Fault trench were an additional subject of contention between Garniss Curtis (UC Berkeley) and Steve Korbay (Harding Lawson Associates) during the investigation that was discussed earlier in this report. In 1993, Jones and Collins also had concerns about interpretations of earthflow failure planes versus faults in the Chicken Creek basin area when they observed road cut exposures together with UCB staff and geotechnical consultants.

Plume Monitoring Sites

A series of monitoring and water quality sampling wells were constructed at the plume sites during 1990s when contamination monitoring was first required by State of California Department of Toxic Substances Control as a condition of LBNL's Hazardous Waste Facility Operating Permit (issued in 1993). The criteria for establishing well locations came from historic data review for activities in each building at LBNL that could have potentially led, during normal operations, to dumping, spills and accidents prior to the existence of any environmental regulations and oversight. Figure 16 shows the location of all the wells, some of which LBNL has already closed, i.e. "properly destroyed" or is in the process of closing.

CMTW-22 cont.

Additionally, Figure 16 shows the location of the wells relative to the contaminant plume boundaries mapped by LBNL. Although numerous wells are located within the plume boundaries delineated by LBNL, the perimeters are not constrained by active sampling wells, especially along the potential migration pathways of faults, drainage courses, utility and sewer trenches, (and other engineered backfill) and landslides, as demonstrated in Figure 17a (map legend is Figure 17b). Bedrock contacts between Moraga and Orinda Formations (Figure 8a and 8b) are important, but were too complex to include in Figure 17a.

In order to adequately assess whether the monitoring wells are defining the actual contaminant plume boundaries, agreement on location of faults, bedrock contacts, and landslide boundaries is needed which is based upon well-founded information of what is actually known and what is hypothesized. Once improved mapping is accomplished at a higher resolution and accuracy than in the maps presented in this report, a strategy can then be developed to determine future locations of key sampling and monitoring sites. Until this is accomplished, there is reason for credible concern about contaminant plume boundaries and the groundwater monitoring program conducted to date by the LBNL.

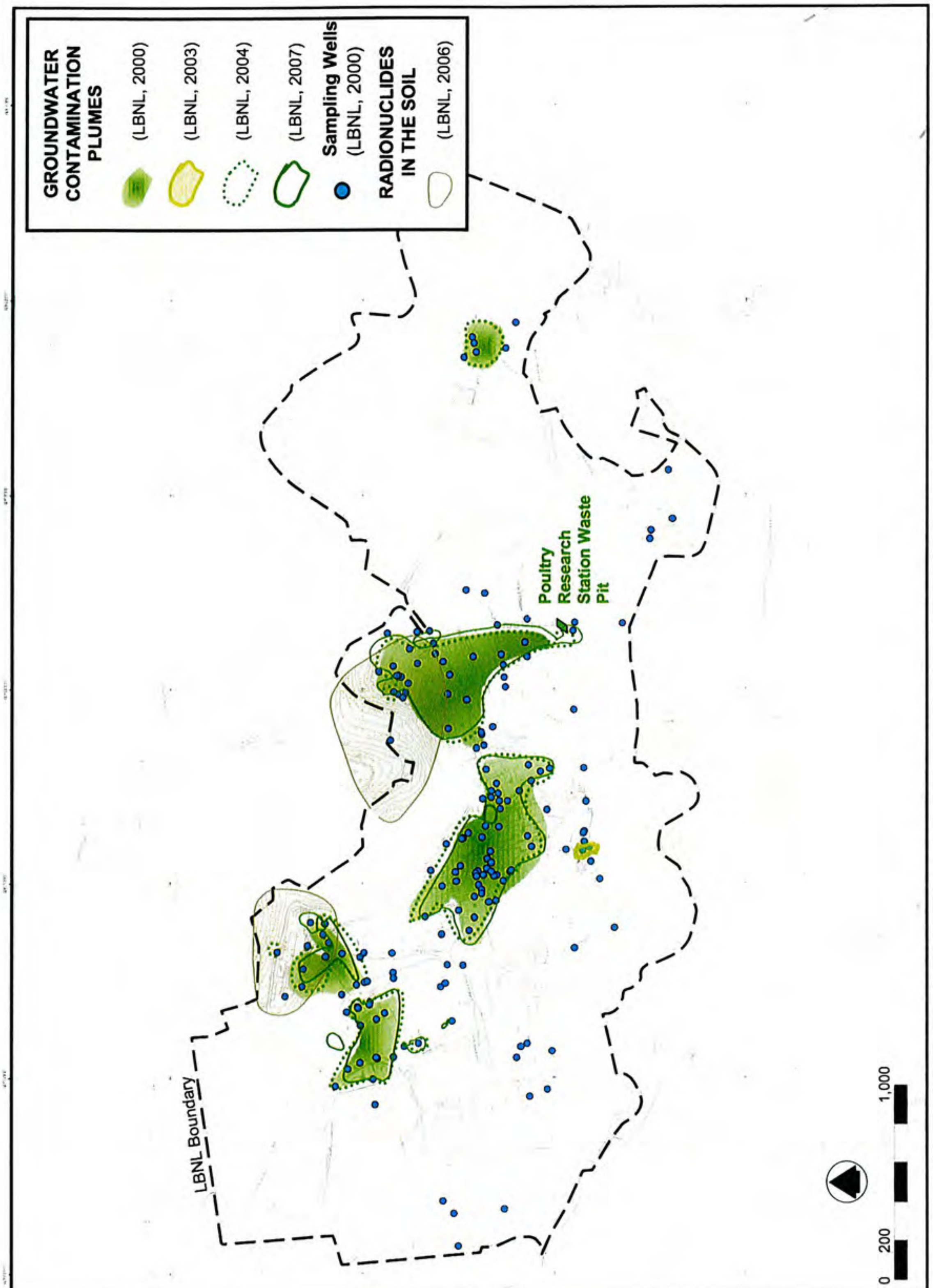

FIGURE 16. GROUNDWATER CONTAMINATION PLUMES AND SAMPLING WELLS

CMTW-22 cont.

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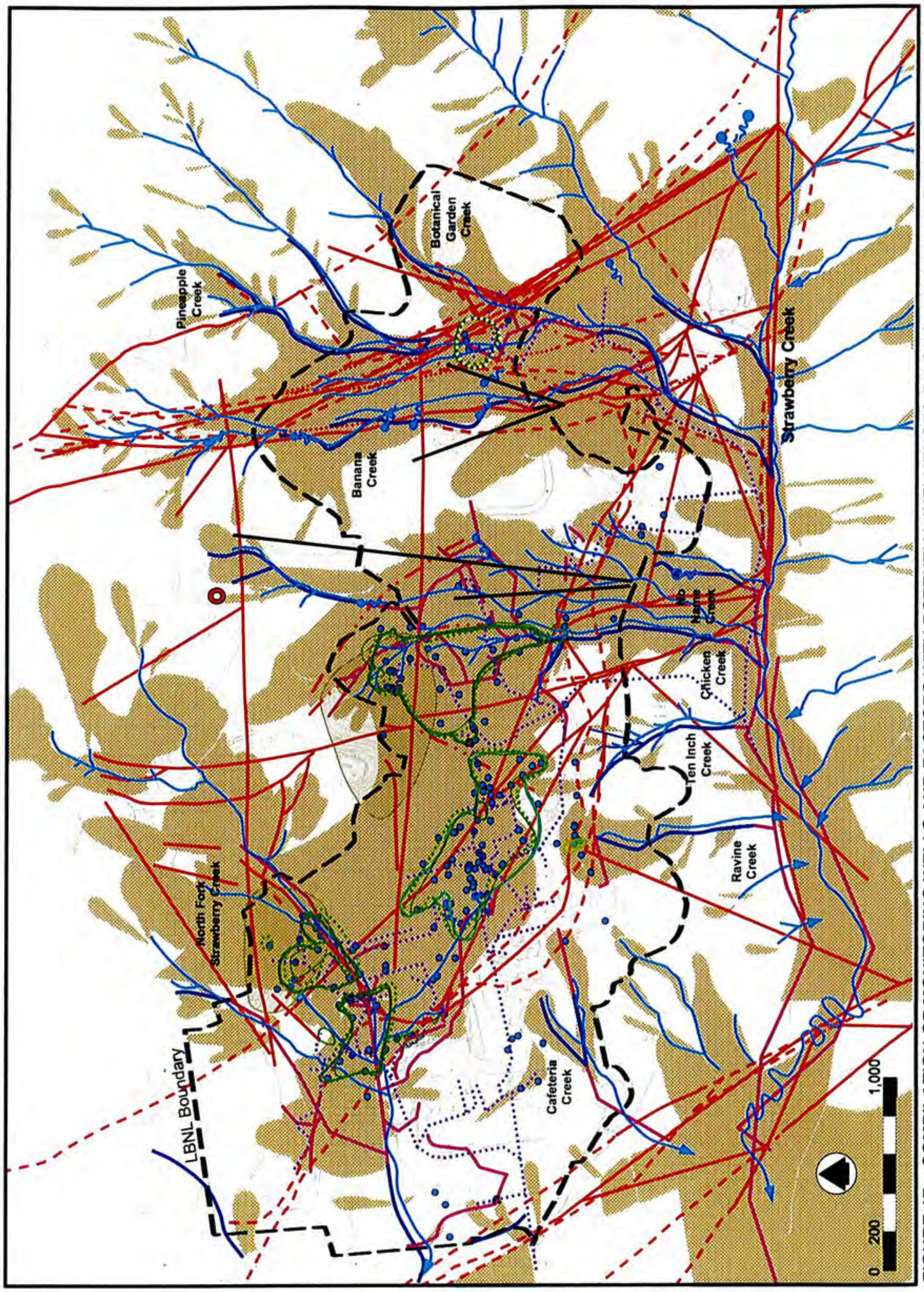

FIGURE 17a. COMPILATION OF MONITORING WELLS AND FACTORS WITH POTENTIAL INFLUENCES ON GROUNDWATER TRANSPORT AT LBNL. FOR BEDROCK CONTACTS VIEW FIGURES 8a AND 8b. SEE NEXT PAGE FOR MAP LEGEND.

CMTW-22 cont.

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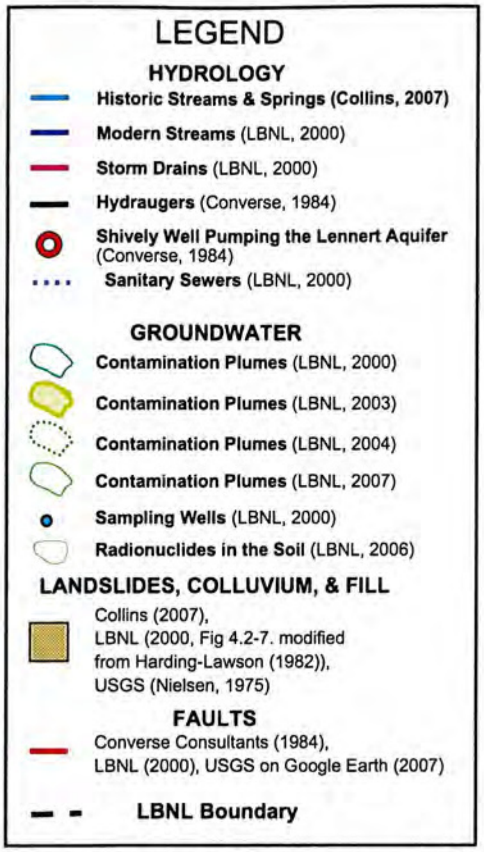

FIGURE 17b. LEGEND FOR FIGURE 17a COMPILATION OF FACTORS WITH POTENTIAL INFLUENCES ON GROUNDWATER TRANSPORT AT LBNL.

CMTW-22 cont.

Zones of Concern for Potential Plume Migration

Given the status of what is currently known, Zones of Concern for potential migration of contaminant plumes are delineated in Figure 18a (legend shown in Figure 18b). These are areas where contaminant migration might yet be undetected because of either insufficient placement of sampling wells or insufficient understanding and/or consideration of where bedrock contacts, faults, landslides, utility trenches, and current or historic drainages exist. These zones were based upon the compilations of many other researchers mapping of geology, and infrastructure. The compilation maps shown previously were used to define Zones of Concern because we do not have knowledge of which individual geology or landslide map is most accurate. Hence, the Zones of Concern should be considered suggestive of possible areas requiring further investigation.

The zones provide a graphic example of why either a better array of monitoring wells are needed and why a verifiable picture of the physical landscape is essential in Strawberry Canyon. Furthermore, potential surface water contamination is possible along drainages that intersect faults, landsides, and bedrock contacts that intersect contaminant plumes. An additional component of contaminant plume analysis not addressed in our project is the depth of contamination and subsurface geologic conditions. These require three

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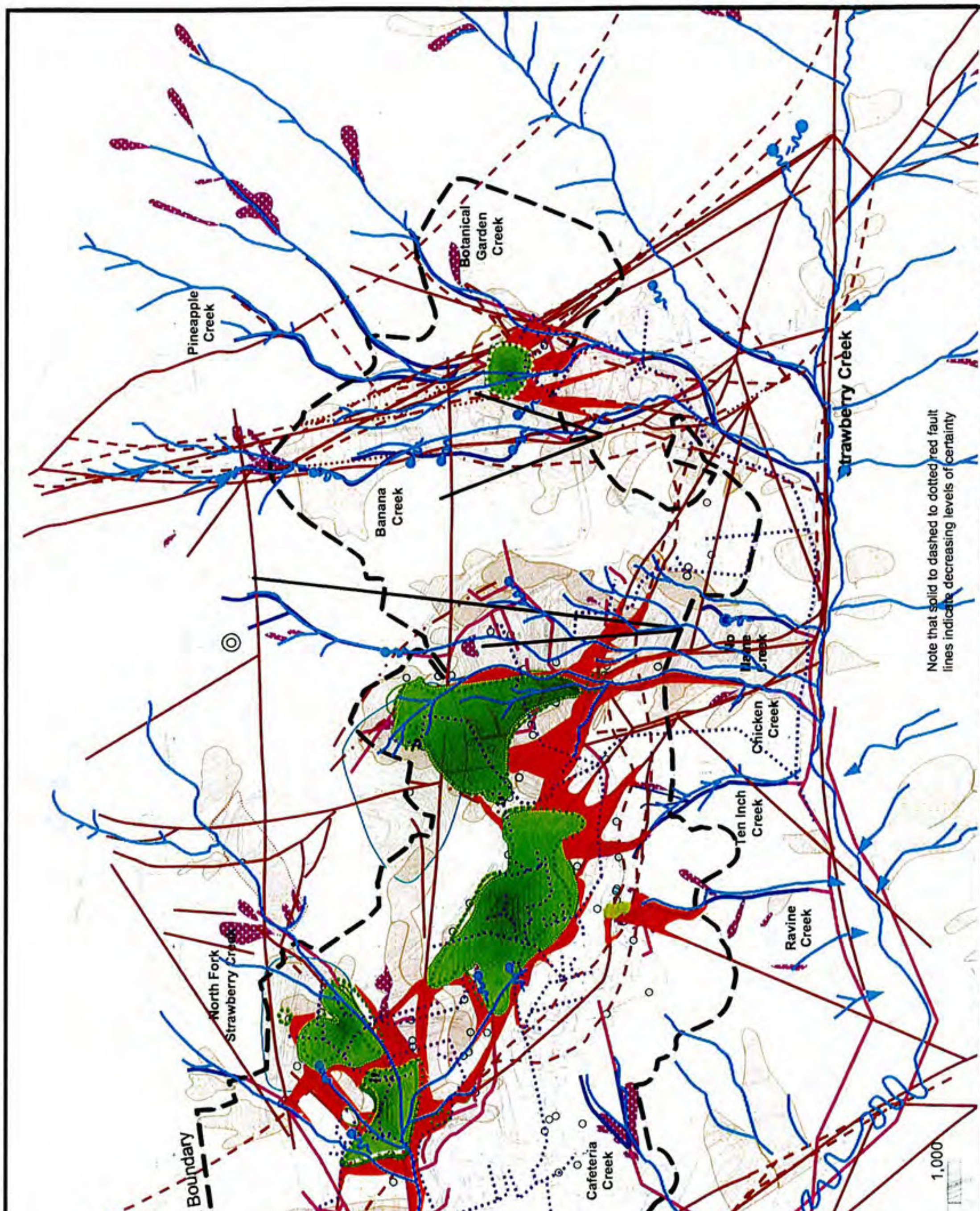

FIGURE 18a. ZONES OF CONCERN FOR GROUNDWATER PLUME EXPANSION ALONG COMPILED FAULTS, BEDROCK CONTACTS, LANDSLIDES, HISTORIC AND MODERN CREEKS. SEE NEXT PAGE FOR MAP LEGEND.

CMTW-22 cont.

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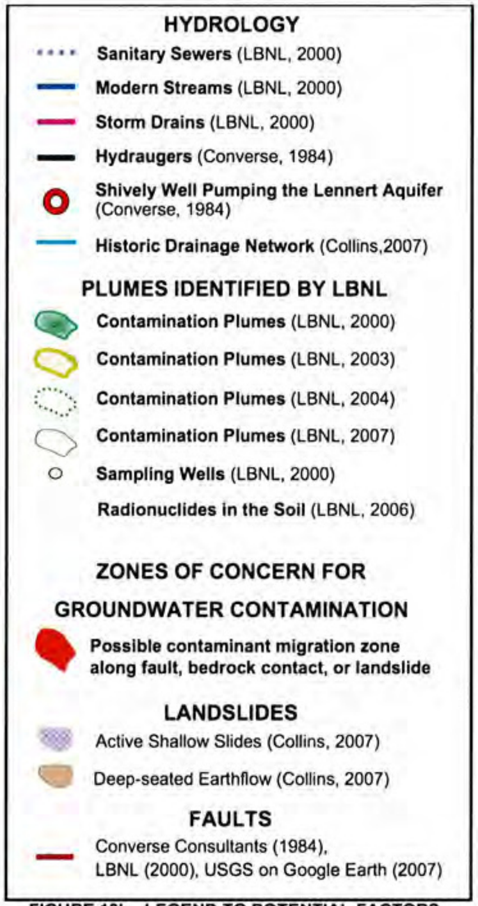

FIGURE 18b. LEGEND TO POTENTIAL FACTORS INFLUENCING CONTAMINATED GROUNDWATER PLUME EXPANSION

CMTW-22 cont.

dimensional analyses, which LBNL has shown on their GIS-based maps (LBNL 2000) that use as their foundation the geologic picture of Figure 7a and fault map of Figure 9a.

Future Development and Site Conditions

The LBNL presently occupies 202 acres, however by 2025 LBNL anticipates a net increase of occupied space of about 660,000 square feet, an increase of 1000 people, and up to 500 additional parking spaces (LBNL, 2007a). Figure 19 shows the tentative footprint of proposed future buildings in their Long Range Development Plan, which is available at www.lbl.gov/LRDP/. The map shows about 30 new buildings dispersed throughout their property boundary. Much of the new construction is planned for areas previously avoided because of stability or fault issues. For example, the majority of the new construction will be located in the Chicken Creek basin and the East Canyon where deep-seated landslides have been mapped.

Figure 20a (map legend shown in Figure 20b) shows landslide hazard risks (as mapped by LBNL) and deep-seated landslides (as mapped on the historic drainage network in Figure 13f by Collins). Interestingly, the deep-seated slides are not considered areas of high to medium risk even though large-scale landslide movement could be triggered by

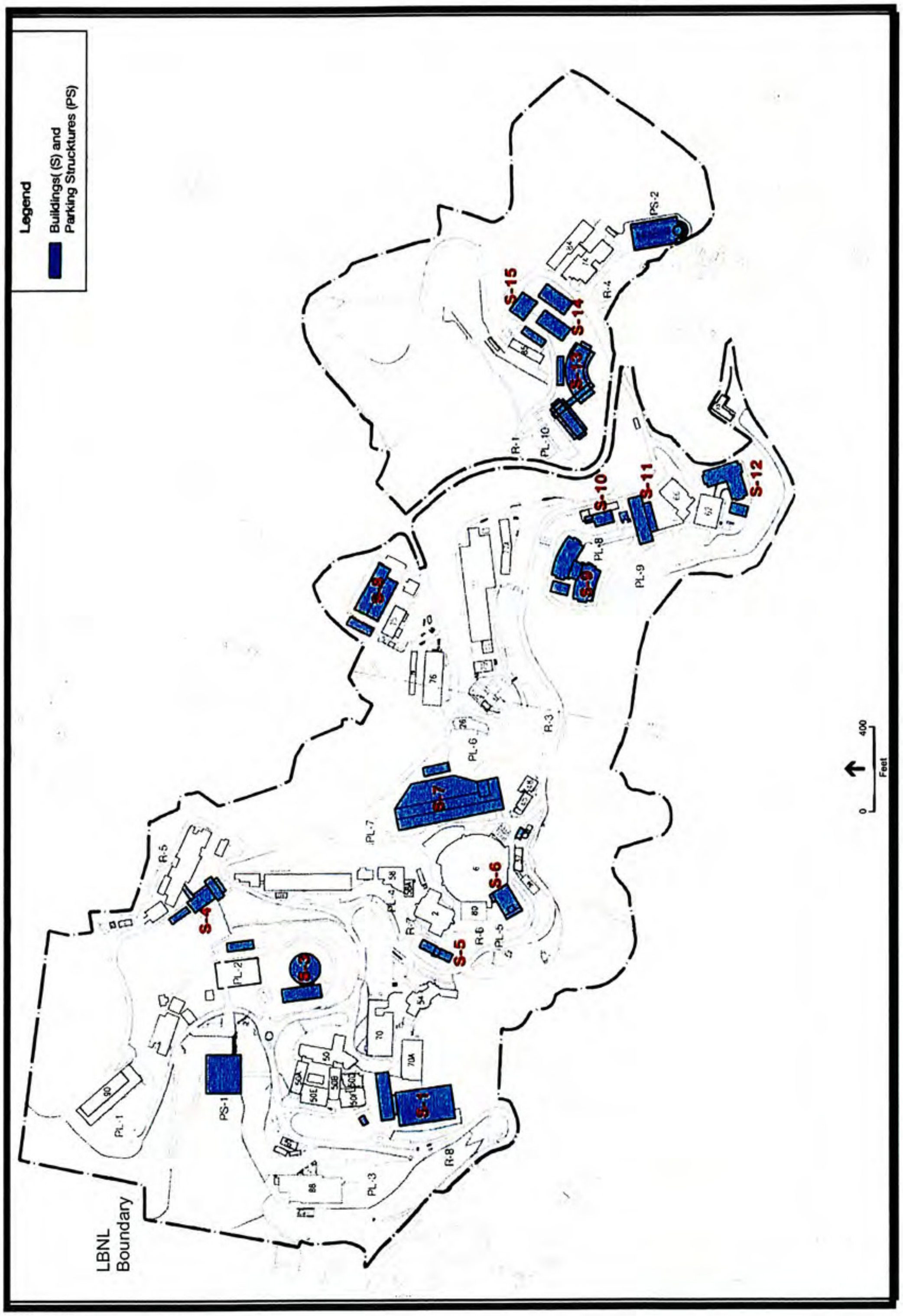

Figure 19. FUTURE BUILDING SITES AT LBNL ACCORDING TO LONG RANGE DEVELOPMENT PLAN (LBNL, 2007a).

CMTW-22 cont.

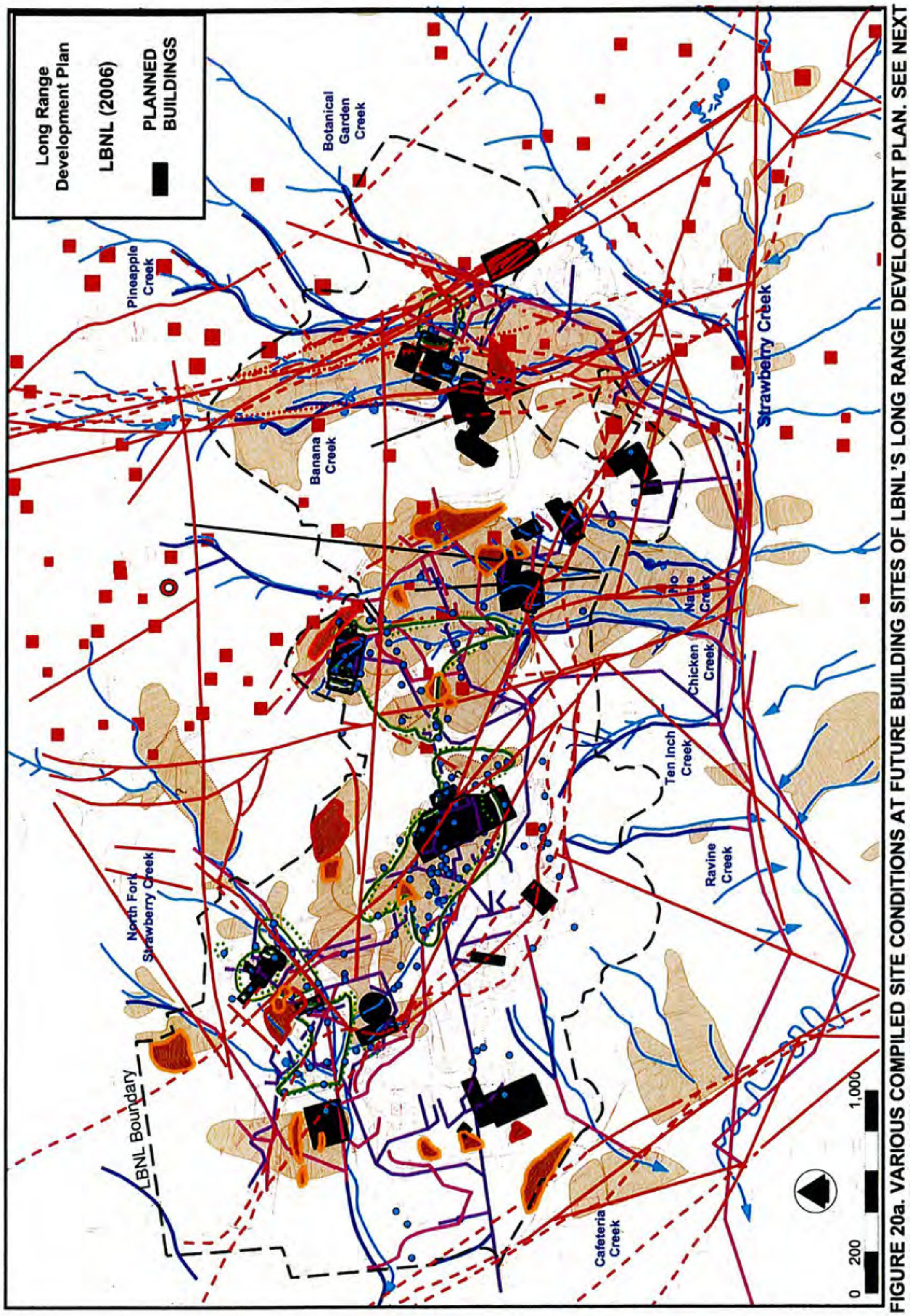

FIGURE 20a. VARIOUS COMPILED SITE CONDITIONS AT FUTURE BUILDING SITES OF LBNL'S LONG RANGE DEVELOPMENT PLAN. SEE NEXT PAGE FOR MAP LEGEND. NOTE THAT SOLID TO DASHED TO DOTTED RED FAULT LINES INDICATE DECREASING LEVELS OF CERTAINTY.

CMTW-22 cont.

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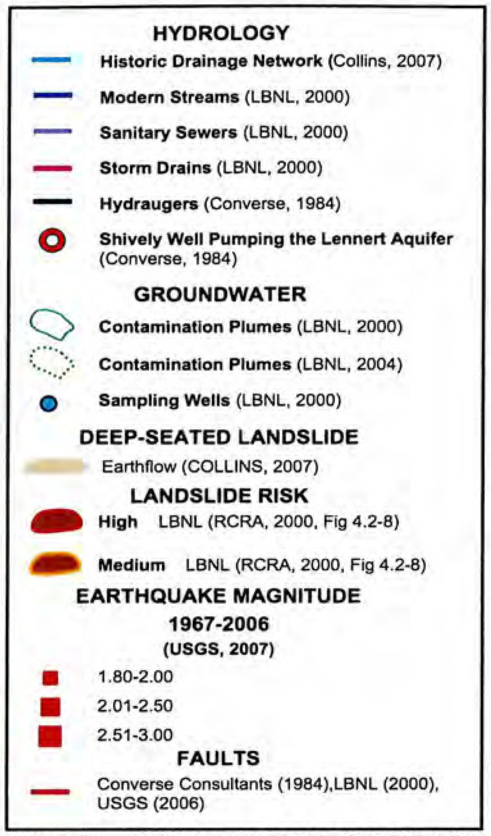

FIGURE 20b. KEY TO MAP 20a SITE CONDITIONS AND FUTURE BUILDING LOCATIONS

CMTW-22 cont.

large magnitude earthquakes on the Hayward Fault and many of the slides overlay or intersect faults. Many buildings are shown to straddle faults that occur on the deep-seated landslides. Various other compiled site conditions in Figure 20a are also shown at the proposed LBNL building sites including the known contaminant plume locations. Some of the new building sites would require grading within the plume locations, which could alter existing groundwater transport pathways, as well as require special handling of contaminated soils.

As planning proceeds, Environmental Impact Analyses will require geologic and environmental information. These required legal documents demonstrate additional future needs for integrated and comprehensive mapping efforts of geologic and environmental conditions in Strawberry Canyon. As more excavations and investigations are conducted, the opportunities will increase to make verifiable geologic maps showing actual bedrock, landslide, and fault exposures.

CONCLUSIONS AND GENERAL RECOMMENDATIONS

At the very least, it is important to identify where there is valid disagreement on geologic conditions, particularly at contaminant plume sites, to determine if these sites pose a threat to human health and safety. Specific investigations or well placed monitoring wells could be designed to resolve some of these issues. Without an improved understanding and portrayal of the geology in Strawberry Canyon, it is difficult to accept that the monitoring sites were specifically designed to detect potential movement of groundwater along intersecting faults, landslide failure planes, bedrock contacts, utility trenches, storm drains, and historic drainages.

If the complexity of geologic conditions at the contamination sites has been and continues to be oversimplified, and because monitoring wells were not placed at key locations along faults, utility trenches, old creek beds/seeps and other parameters that influence groundwater movement, the extent and dispersement of contaminants may have been, and will continue to be underestimated in the future. As development continues in the Strawberry Creek Watershed, and probabilities increase for more uncontrolled releases and contaminant spills, the need will also increase to have an improved and comprehensive base of understanding. Protection of human health and water quality should be a priority, requiring more than a conservative approach when trying to investigate the extent of toxic contamination in an urban environment.

- An outside scientific technical review group should be formed to oversee LBNL's plume monitoring strategy and evaluate interpretations of plume migration.
- The types of factors that influence groundwater flow that have been compiled on the maps in this report should be developed on a three dimensional GIS base map.
- Information from previous consulting reports should be compiled to show the locations of verifiable bedrock outcrops, landslide deposits, landslide failure planes, and fault trace locations.
- Confidence levels should be assigned to various features such as faults, bedrock contacts, landslides, and boundaries of plume contamination.
- Future geologic investigations and excavation work in Strawberry Canyon should be required to show verifiable geologic exposures on the same base map and assign confidence levels to future interpretations.
- Further investigation of the nature of faulting, geology, and landslides in Strawberry Canyon should be conducted.

CMTW-22 cont.

ACKNOWLEDGMENTS

We thank the Citizens' Monitoring and Technical Assessment Fund for supporting this project and the Urban Creeks Council for administering the grant. Gretchen Hayes is thanked for constructing many map overlays. Eric Edlund assisted with topographic base map production. Gene Bernardi, Roger Byrne, Claudia Carr, Jim Cunningham, Mark McDonald, and L. A. Wood are thanked for draft review, and Landis Bennett for posting the report on the web. Cover photograph courtesy of berkeleycitizen.org.

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CMTW-22 cont.

LBNL/SLS II/DEIR COMMENTS/PART 2

Committee to Minimize Toxic Waste

Jeff Philliber
Environmental Planning Group
Lawrence Berkeley National Laboratory
One Cyclotron Road, MS 76-234 A
Berkeley, CA 94720

January 26, 2009

Comments on the Notice of Preparation (NOP)/Environmental Impact Report (EIR) under CEQA and Environmental Assessment (EA) under NEPA for Seismic Life Safety Phase 2B Project at the Lawrence Berkeley National Laboratory

CMTW-23

Dear Mr. Philliber,

Again - another proposed project, this time with at least 17 (seventeen) individual components, in the treacherous Strawberry Canyon Caldera, the location of the Lawrence Berkeley National Laboratory (LBNL).

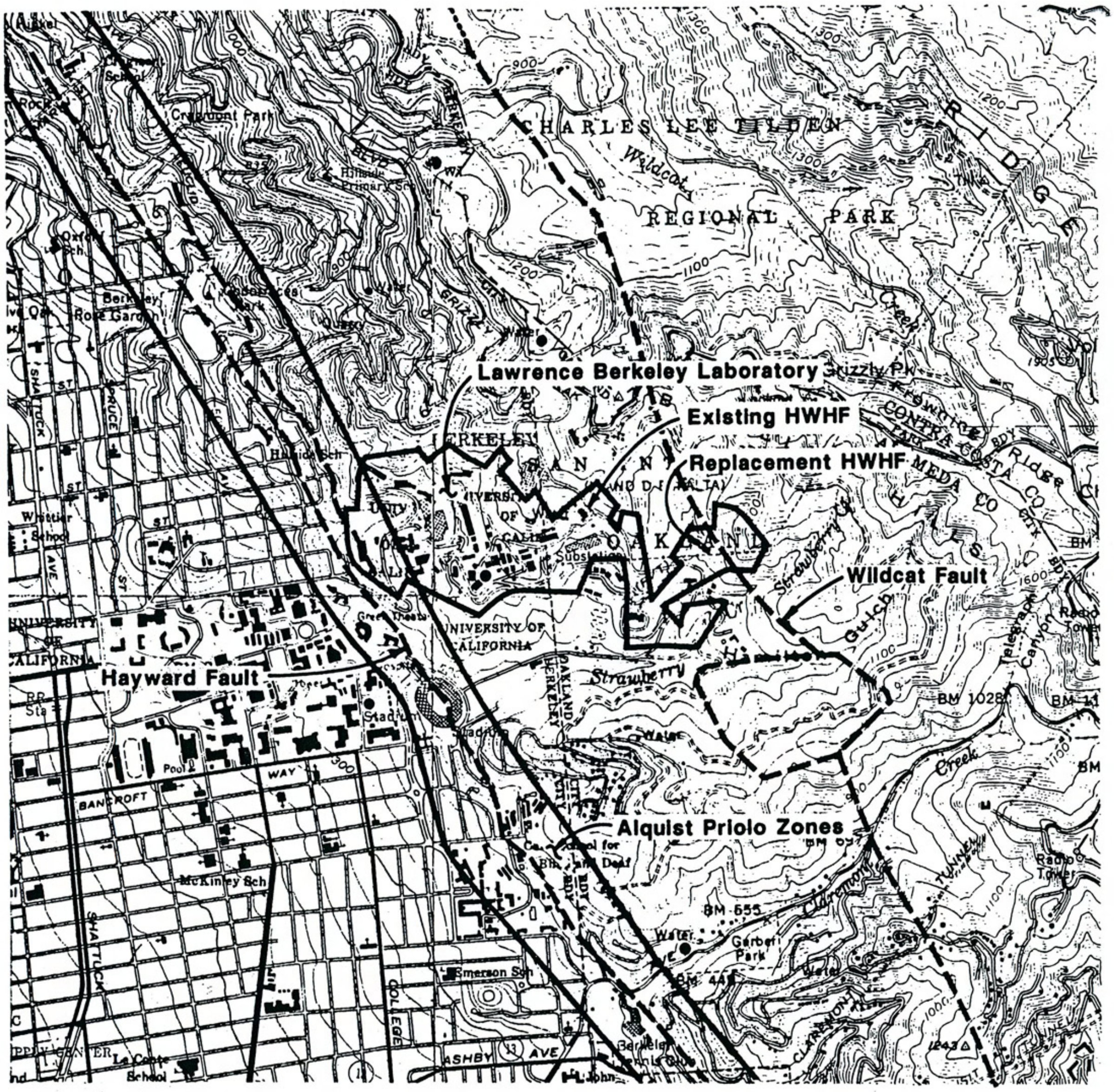
It will be impossible to adequately analyze the environmental impacts of these 17 individual projects in one EIR/EA as proposed.

At minimum we ask that the project be severed to its 5 major geographical components, as described in Figure 3 of the NOP's project information section, and that 5 separate, individual EIR/EA/EIS reports be prepared, for the reasons stated below.

The entire LBNL campus is situated in the HAYWARD EARTHQUAKE FAULT IMPACT ZONE (HEQFIZ), as seen in the 1992 USGS map (page 2), sandwiched between the Hayward Fault and the Wildcat Fault.

CMTW-24

The inadvisability of any development/any new development in the Strawberry Canyon Caldera is very soberly described by UC Berkeley's Garniss H. Curtis, Professor Emeritus, Department of Earth and Planetary Science in his May 11, 2008 comment letter (pages 3-5). We ask that all these concerns be addressed in the EIR/EA/EIS reports' Geology and Soils section. It appears that, since the collapsed caldera is filled with unstable landslide materials, a major earthquake along the Hayward Fault will have Potentially Significant Impacts, that cannot be mitigated by anything other than not building in the canyon, i.e. a complete moratorium on new construction at LBNL and a gradual off-loading of facilities from the Hill to safer areas. We ask that this scenario be included in the scope of the EIR/EIS.



CMTW-25

SOURCE: Base Map U.S.G.S.
California Division of Mines and Geology 1992

FIGURE II-20
MAP SHOWING ALQUIST PRIOLO ZONES AND WILDCAT FAULT

Statement of Garniss H. Curtis, Professor Emeritus Department of Earth and Planetary Science, U.C. Berkeley

On Sun, May 11, 2008 at 2:10 PM, Garniss Curtis <gcurtis@berkeley.edu> wrote:

To: anne.shaw@ucop.edu
From: Garniss Curtis <gcurtis@berkeley.edu>
Subject: regarding certification of final environmental impact reports for the proposed computational research and theory facility and the Helios energy resource facility and project approvals. [*Please note that several typographical errors and misspellings have been corrected in the following text.*]

As the request for my geologic opinion on the advisability of constructing large buildings in the lower part of Strawberry Canyon and in the next canyon to the north known as Blackberry Canyon came to me on May 4th, I have to be brief and rely on my memory. I shall first say as strongly as I can "absolutely do not construct any buildings in those two canyons", then I shall go into the reason based on the work I did as consultant to Mr. Ben Lennart 25 to 35 years ago, who was contracted by the University to investigate a number of sites for possible constructions or for stopping landslides that were threatening buildings.

First, the geologic setting of the two areas: The active Hayward Fault goes across the mouths of both canyons. Further east, the Wildcat Canyon fault parallels the Hayward Fault behind the Botanical Gardens and northward joins the Hayward near the town of San Pablo. Southward the Wildcat Canyon fault can be easily traced to Sibley Park and beyond. A few small epicenters lie along this fault near its junction with the Hayward, but it does not seem to be active elsewhere to the south. However, in the past, the area between the two streams and the two faults (which includes the whole of the Lawrence Laboratory complex) lay four miles to the south next to Sibley Park. The volcanic rocks in both areas have potassium-argon dates of approximately 10 million years, and the rhyolite found in both of them is the same rhyolite. The volcanic rocks underlying most of the Lawrence Lab complex fill an old crater, a collapse caldera. The old volcano that once rose above these rocks collapsed after the expulsion of a very large amount of rhyolite ash, now largely removed by erosion. The volcanic rocks broke up as the collapse occurred and many show crushing and deformation and are mixed with large amounts of ash and volcanic fragmental debris. This material should never have been built on as it is so clay-rich and unconsolidated. The western rim of this caldera is easily traced from its arcuate shape which is cut off by the Wildcat Canyon Fault just south of the Botanical Gardens near the upper part of Strawberry Creek. It swings around very close to the old Cyclotron and continues north to join the Wildcat Canyon Fault in Wildcat Canyon not far from the Merry-go-Round in Tilden Park. The boundary rocks to the west are sandstones and shales thought to be of Cretaceous age, that is, they are older than 65 million years. Exposures of these

CMTW-26

sandstones and shales are good below Building 50 down to Bowles Hall, and they dip westward at angles of 20 to 25 degrees, about which more later. The Hayward Fault passes very close to the rear of Bowles Hall after going through the Stadium where it has caused major deformation of the support pillars and offset of the two sides of the stadium since its construction in 1927.

Behind Hearst Mining Bldg and a few feet to the east, is the Lawson Adit which is a tunnel going eastward. Begun in the 1920' or earlier, it was completed in 1938 when it reached the Hayward Fault. Professor George Louderback told me (Personal comm.) that it was not ordinary fault gouge that he found in the Hayward Fault zone but a peculiar mixture of serpentine and metamorphic rocks that also appear on the surface and underlie Stern Hall and part of Foothill Student Housing. Founders Rock near the corner of Hearst and Gayley Road is in this melange. Also in the tunnel are several exposures of the offset of Strawberry Creek as determined from the contained rounded cobbles of Strawberry Canyon origin . Thus this indicates a displacemeent of more than 600 feet north along the Hayward Fault.

Still further north along the Hayward all the way to San Pablo huge amounts of the melange similar to that in the Lawson Adit have been squeezed out of the Hayward Fault and are gradually sliding down the slope below the fault. Much of this melange has reached the bottom of the hill back of El Cerrito. Along the Arlington many houses built on this melange are sliding and have caused a great number of legal problems. Within the fault itself no movement can be detected in these deposits, some of which are more than 100 feet thick. Thus we believe that movement and expulsion of this melange takes place during major earthquakes on the Hayward Fault.

CMTW-26 cont.

A great deal of research has been done recently on the Hayward Fault by the USGS at Menlo Park which was reported in a talk on the last Thursday of this past April. They have established a return time of major quakes of 6.5-7 magnitude on the Hayward Fault of 130 years. The last major quake along the northern part of the Hayward Fault was 140 years ago, so we are over-due. They estimate that there is approximately a 65 percent chance a major quake will occur in the next 30 years.

Lennart was able to get survey notes from East Bay Municipal Utility District for the San Pablo Dam water tunnel to El Cerrito which crosses the Hayward Fault and shows that the right lateral horizontal movement of approximately one centimeter per year is matched by uplift of the east side of the fault of approximately one centimeter per year also. So, with the evidence of the horizontal displacement of the old Strawberry Creek of 600 feet horizontally along Galey Road, the Cretaceous sedimentary rocks east of the Hayward Fault there have also risen 600 feet. Building 50(?) sits on these Cretaceous strata which, as mentioned, dip westward 20-25 degrees. If an earthquake occurs when these beds are soaked with winter rains the chance of a major landslide are great along the slippage planes of shale dipping westward. Minor slides have already occurred in these beds behind Bowles Hall. Indeed, the Foothill Student Housing was planned to be built there until I called attention to the landslide. A major landslide would probably destroy all the buildings on both sides of Galey Road from the Stadium to the buildings on both sides of Hearst Avenue and would probably reach Dow Library, destroying everything in its path to that point and possibly beyond. Buildings in the lower parts of both Strawberry and Blackberry Canyons would be buried if not destroyed.

Major landslides of the type I have described here are not rare along the Hayward Fault as was shown to us during our study of the Hayward fault at the base of the hill behind the Clark Kerr Campus. We discovered that most of that campus was underlain by a large landslide that had originated in Claremont Canyon, and was gradually moved northward along the Hayward Fault. Trenches and drill holes showed this landslide to be up to 30 feet thick. It extends westward to and possibly beyond Piedmont Ave. Further south is a huge landslide that underlies most of the campus of Mills College and extends westward another quarter mile Still further south are more large slides that have originated in canyons and steep slopes east of the Hayward Fault. As the hills rise and become unstable, earthquakes cause them to break loose and slide. Very few large slides have occurred on the eastern slopes of the Berkeley Hills, hence the relationship to earthquakes of major landslides close to the Hayward Fault along the western slopes of the Berkeley Hills. Normal erosion rounds off unstable areas on the eastern slope of the Berkeley Hills before they break loose and slide. **CMTW-26 cont.**

Most of the buildings of the Lawrence Lab. are on the unstable ground filling the old caldera, particularly the Bevatron and associated buildings. As the Cretaceous beds immediately west of these buildings have been eroded away there is nothing to keep these soft caldera-filled beds from sliding. The buildings on them will certainly move a few feet in a major earthquake if not hundreds of feet. Keep in mind the Loma Prieta quake of l989 of magnitude 6.9 which from a distance of over 60 miles destroyed a section of the Bay Bridge, a section of the overhead freeway in Oakland killing 63 people, and many houses on filled ground in the Marina of northern San Francisco some 70 miles from the quake!

No major buildings of any kind should be constructed in either of these canyons bordering this huge block of unstable rock.

--

Profesor Emeritus Garniss H. Curtis
Dept. Earth and Planetary Science
University of California, Berkeley, CA

Garniss H. Curtis
Berkeley Geochronology Center
E-Mail: gcurtis@uclink.berkeley.edu

LBNL is a nuclear-industrial complex and many of the 14 structures proposed for demolition have been potentially used for work involving radioactive and hazardous materials and are potentially located on contaminated soil and on top of known radioactive and hazardous waste contamination plumes.

The NOP document referred to these 14 structures as trailers, labs and shops without any specifics as to their past use.

LBNL's Site Environmental Reports provide the following names and descriptions:

Buildings

25 Mechanical Technology/Engineering Shop
25B Waste Treatment Facility
55 Research Medicine/Radiation Biophysics

(74 Research Medicine/Radiation Biophysics, Cell&Molecular Biology Laboratory)
74F Housing for animals used for research at facility above

4 Magnetic Fusion Energy (MFE)/ALS Support Facility
5 Magnetic Fusion Energy (MFE)/Accelerator and Fusion Research
14 Accelerator&Fusion Research&Earth Sciences
16 Magnetic Fusion Energy Laboratory/Accelerator and Fusion Research Laboratory
17 EH&S/Applied Sciences Lab

(71 Heavy Ion Linear Accelerator (HILAC/Center for Beam Physics, Ion Beam Technology)
71 C, D, F, H, J, P <u>B-Factory</u> associated with facility above

LBNL operates facilities which contain Radioactive Material Areas (RMAs) that are subject to radioactive air emissions regulations of NESHAPs (National Emission Standard for Hazardous Airborne Pollutants) and have the pontial to emit radionuclides into the atmosphere. Building 55 has at least 9 such sources.

We ask that the Hazards and Hazardous Materials sections of the EIR/EIS address/describe in detail the history of the uses of all the 14 buildings proposed for demolition and list all the equipment and radioactive/hazardous materials used at these structures and the various kinds of wastes generated there during their lifetime.

This will help to better assess the degree of contamination associated with each of the structures, lab equipment, waste water/sewer lines, sumps etc. Especially, as you know, almost 3 pounds of mercury was recently found in a Building 71Q storm drain sump, (pages 7-8) estimated to have been there from 10 to 40 years.

CMTW-27

impact Special categories	Cat OE – operational emergencies	Cat R - recurring

25. Description of Occurrence

On September 29th, while cleaning out a catch basin using a vacuum extractor, Facilities Labor Shop employees observed metallic mercury in the sediment at the bottom of the catch basin. Work was stopped and EH&S was contacted. The asphalt area around the catch basin was assessed for mercury and decontaminated, as subsequently was the vacuum truck. The extracted sediment was removed from the vacuum truck and stored in a 55-gallon drum; the drum was placed in a WAA. Waste materials from the cleaning were properly discarded. The catch basin itself was temporarily closed and sealed with polyethylene sheeting pending future clean up response planning and investigation.

On October 12th, Labor Shop personnel, under the supervision of site IH personnel, removed the rest of the contaminated sediment from the catch basin and placed it in a lined 30-gallon drum. The drum was placed in a WAA, and samples of the sediment inside this drum and the drum noted above (from the original effort to clean the catch basin) were collected on October 14th. Also that day a video camera was inserted into a 4-inch cast iron pipe leading to the catch basin and a 10-inch corrugated metal pipe leading out of it. This effluent pipe was corroded, and the camera could not be inserted very far into it. No mercury was observed in either of these two pipes. Additionally, six sediment samples were collected from a concrete structure at the outfall of the storm drain line to the North Fork of Strawberry Creek. Sampling results from the analytical laboratory were received Oct 21, 2005. They indicate that it is unlikely that any mercury had been released into the creek: two samples were non-detect at a detection limit of 0.13 and 0.16 mg/kg, respectively, and the maximum of the 4 other samples was 0.34 mg/kg, within the 0.5 mg/kg background concentration of mercury for Berkeley Lab soil and bedrock.

The two samples taken from the drums which contained catch basin sediment showed the following results for mercury: 7,900 mg/kg in the 30-gallon drum, and 2,400 mg/kg in the 55-gallon drum. Based on the actual weight of the sediment in the drums, the amount of mercury found in the catch basin was calculated to be 2.9 pounds. This exceeds the federal reportable quantity for mercury of 1 lb. Accordingly, on October 24th, LBNL notified the Office of Emergency Services, The City of Berkeley, the Regional Water Quality Control Board, and the Department of Toxic Substances Control (which had previously been informally notified).

CMTW-28

28. Operating Conditions of System/Building/Equipment: The pipe from the floor drain in the basement of building 71 which had led to this catch basin had been cut and capped in 1995 as part of the effort to eliminate illicit connections as required by the California industrial storm water permit held by Berkeley Lab. Mercury had been found in the floor drain and pipe at that time (see SAN-LBL-EHS-1995-0001). The effluent pipe is corroded and blocked, presumably crushed. The catch basin only drains the relatively small surface area around it. According to Laborers' records, this catch basin had been cleaned on 10/26/04, but only to a depth of 68 inches . The bottom of the catch basin has now been determined to be 79 inches. It is presumed that this mercury has been in the sediment of this catch basin for from 10 to 40 years.

CAUSAL INFORMATION

32. Description of Cause:

ISM DEFICIENCIES

35. ISM Deficiencies or Weaknesses (check all that are applicable):

Scope of Work LTA*	Analyzed Hazards LTA	Developed/Implemented Controls LTA
Performed Work Within Controls LTA	Feedback and Improvement LTA	X ISM not applicable

* LTA = Less Than Adequate

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7.

LBNL ORPS SHORT FORM WORKSHEET

Notes and instructions:

1. The ORPS Short Form is used for Significance Category 4 occurrences. Excluding corrective actions required to mitigate the problem, completion of the Short Form constitutes the sole requirement for reporting Category 4 occurrences.
2. Some fields in the DOE ORPS database are not applicable to LBNL operations, thus field numbers in this form are not sequential.
3. Electronic version of this form is available at the LBNL ORPS web site, . Other ORPS references and resources are available at the website or contact the Office of Assessment and Assurance (OAA) at 4046 / 7457 for additional assistance.

FACILITY / PERSONNEL INFORMATION

2. **Name of Division / Department:** Environment, Health, and Safety
3. **Facility Function Code** (check only one):

Explosive (03)	Tritium Activities (09)	Fusion Activities (10)
Environmental Restoration (11)	Solar Activities (14)	Accelerators (16)
Laboratory – Analytical (17A)	Laboratory – R & D (17B)	Balance-of-Plant – Offices (99A)
Balance-of-Plant – Machine shops (99B)	Balance-of-Plant – Site/outside utilities (99C)	Balance-of-Plant – Safeguard / security (99D)
Balance-of-Plant – Storage (99E)	Balance-of-Plant – Laundries (99F)	XBalance-of-Plant – Infrastructure (99G)

5. **Name of Division Director/ Division ORPS Designee:** Regina Lackner
6. **DD / Designee Phone No.:** (510) 486-7413 7. **Job Title of ORPS Designee:** Regulatory Compliance Eng.
11. **Program / Project:** Unknown (historic release)
12. **DOE Secretarial Office** (i.e., sponsoring DOE program; Office of Science [SC] is LBNL's default choice):

BV	EE	EH	EI	EM	FE
ME	NA	NE	NP	RE	X SC (default choice)
SE	SO	SW	UE	WA	

13. **System/Building/Equipment involved in occurrence:** Storm drain catch basin.
17. **Plant Area** (building & room location of occurrence): East of building 71Q.

DATE AND TIME INFORMATION

18. **Discovery** (when event or condition was first identified) **Date:** 9/29/05 **Time:** ~ 10 am.
19. **Categorization** (when reportability and significance determined) **Date:** 10/24/05 **Time:** ~ 9 am.
26. **DOE Notification** **Date:** 10/11/05 **Time:** ~ 2 pm
27. **Other Notification (person and organization contacted):** **Date:** 10/12/05 **Time:** 10 am

	10/24/05	12 pm
Dr. Waqar Ahmad, Department of Toxic Substances Control		
George Leyva, Regional Water Quality Control Board		
Dacia, Office of Emergency Services	10/24/05	12 pm
Nabil Al-Hadithy, City of Berkeley	10/24/05	1 pm

OCCURRENCE DESCRIPTION

20. **Subject / Title of Occurrence:** Mercury in Storm Drain Catch Basin
22. **Significance Category** (each reportable occurrence has a Significance Category. See .)
Cat 1 – significant XCat 2 – moderate impact Cat - 3 minor impact Cat 4 – some impact

CMTW-28 cont.

To further illuminate our concerns we are enclosing a copy of CMTW's March 2007 Report titled:

Contaminant Plumes of the Lawrence Berkeley National Laboratory and their Interrelation to Faults, Landslides, and Streams in Strawberry Canyon, Berkeley and Oakland, California (as a CD).

We specifically ask you to review sections on CONTAMINANT SITES (Chemical and Hazardous Contamination and Radioactive Contamination), DRAINAGE NETWORK MAPPING, FAULT MAPPING, LANDSLIDE MAPPING, ZONES OF CONCERN FOR POTENTIAL PLUME MIGRATION and FUTURE DEVELOPMENT AND SITE CONDITIONS. CMTW-29

Figure 2. in our Report (page 10) shows a significant VOC (Volatile Organic Compound)groundwater plume associated with B 71 and its "trailer" area, surrounded by a radioactive tritium soil plume.

In the "Old Town" area buildings 4, 5, 14, 16 and 17 are all located on top of the huge Old Town VOC groundwater solvent plume.

In the East Canyon the B 74 Diesel plume is migrating into the area of the proposed General Purpose Lab. CMTW-30

Figure 18 a. shows the Zones of Concern at LBNL for Groundwater Plume Expansion along Faults, Bedrock contacts, Landslides, Historic and Modern Creeks. Please note and address in the EIR/EIS that all 5 areas of the proposed " Seismic Life Safety Phase 2B Project" are impacted by migrating groundwater contaminant plumes, earthquake faults and landslides. (page 11.) CMTW-31

Figures 10 and 14 show the mapping of Wildcat Fault and the East Canyon Fault as well as the huge landslide area associated with these faults. It is quite incredible to observe that indeed LBNL/DOE (Department of Energy) knew of the presence of these earthquake faults and landslide areas, and yet proceeded with the construction of the Lab's Hazardous and Radioactive Waste Handling, Storage and Treatment Facility in this treacherous area in 1996, and now must attempt with seismic upgrades of the building (B 85), and the stabilization of the landslide beneath it. (pages 12-13) CMTW-32

Figure 20 a. (page 14) shows various site conditions at future sites of LBNL's Long Range Development Plan. CMTW-33

Please read carefully Garniss H. Curtis' comments: " Most of the buildings of the Lawrence Lab. are on unstable ground filling the old caldera... The buildings on them will certainly move a few feet in a major earthquake if not hundreds of feet." CMTW-34

We ask you to include a very serious analysis of the B 85 situation and instead of a Band-Aid, a plan for relocating these dangerous operations to a more stable and accessible area. CMTW-35

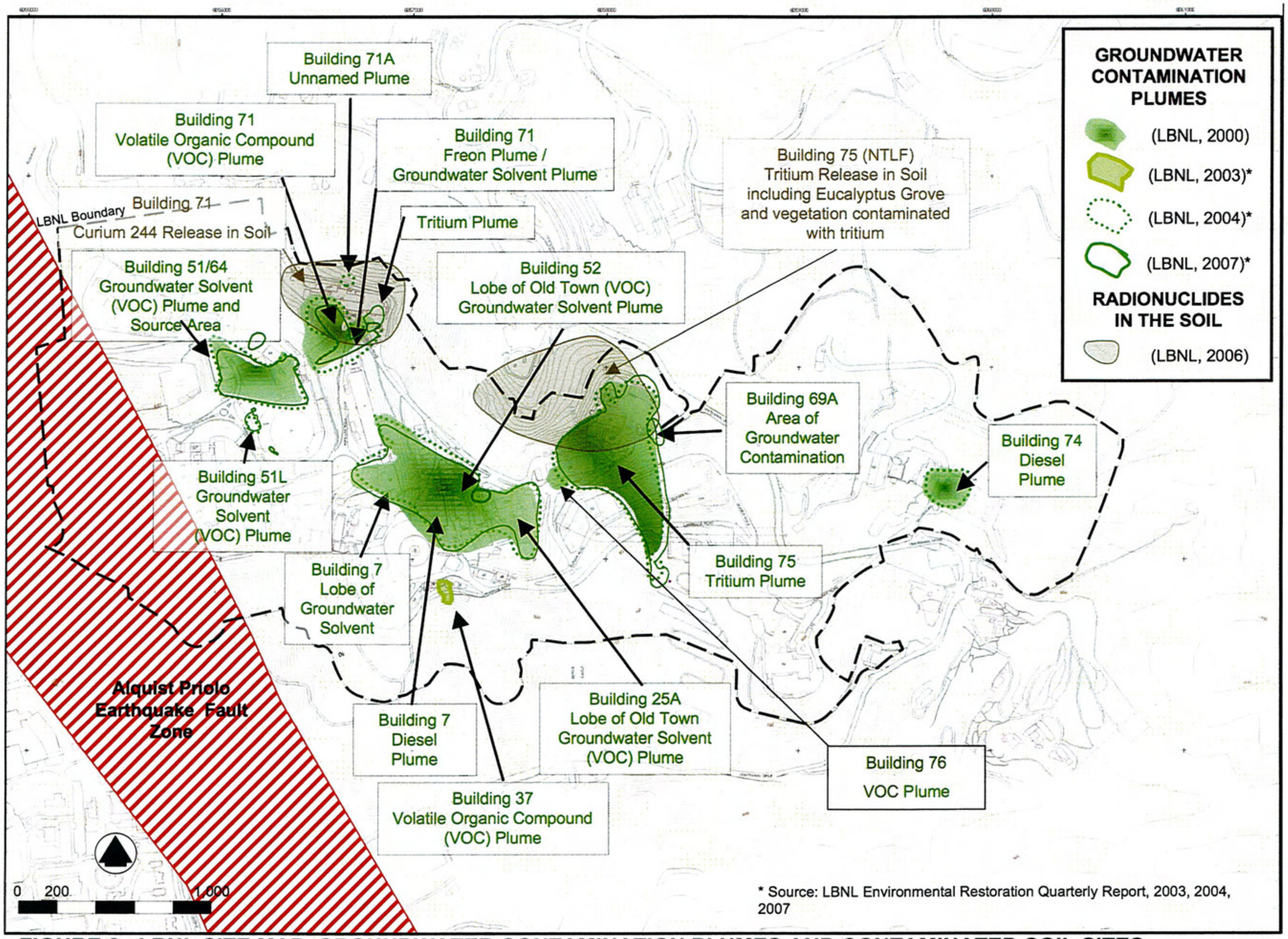

FIGURE 2. LBNL SITE MAP, GROUNDWATER CONTAMINATION PLUMES AND CONTAMINATED SOIL SITES.

10.

74/83

75/83

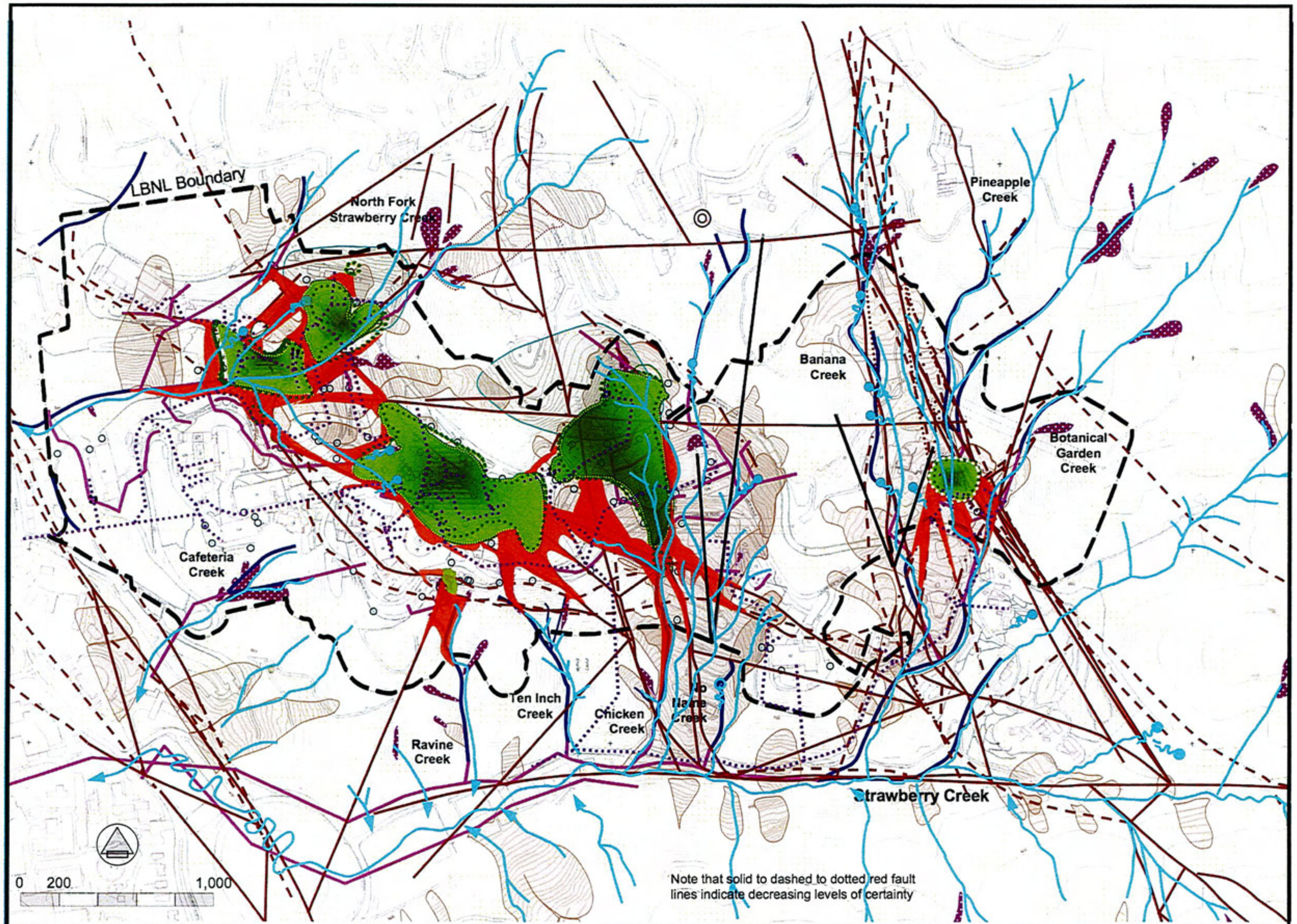

FIGURE 18a. ZONES OF CONCERN FOR GROUNDWATER PLUME EXPANSION ALONG COMPILED FAULTS, BEDROCK CONTACTS, LANDSLIDES, HISTORIC AND MODERN CREEKS. SEE NEXT PAGE FOR MAP LEGEND.

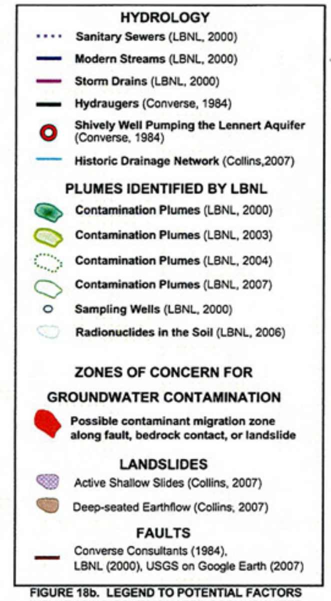

FIGURE 18b. LEGEND TO POTENTIAL FACTORS INFLUENCING CONTAMINATED GROUNDWATER PLUME EXPANSION

11.

CMTW-37

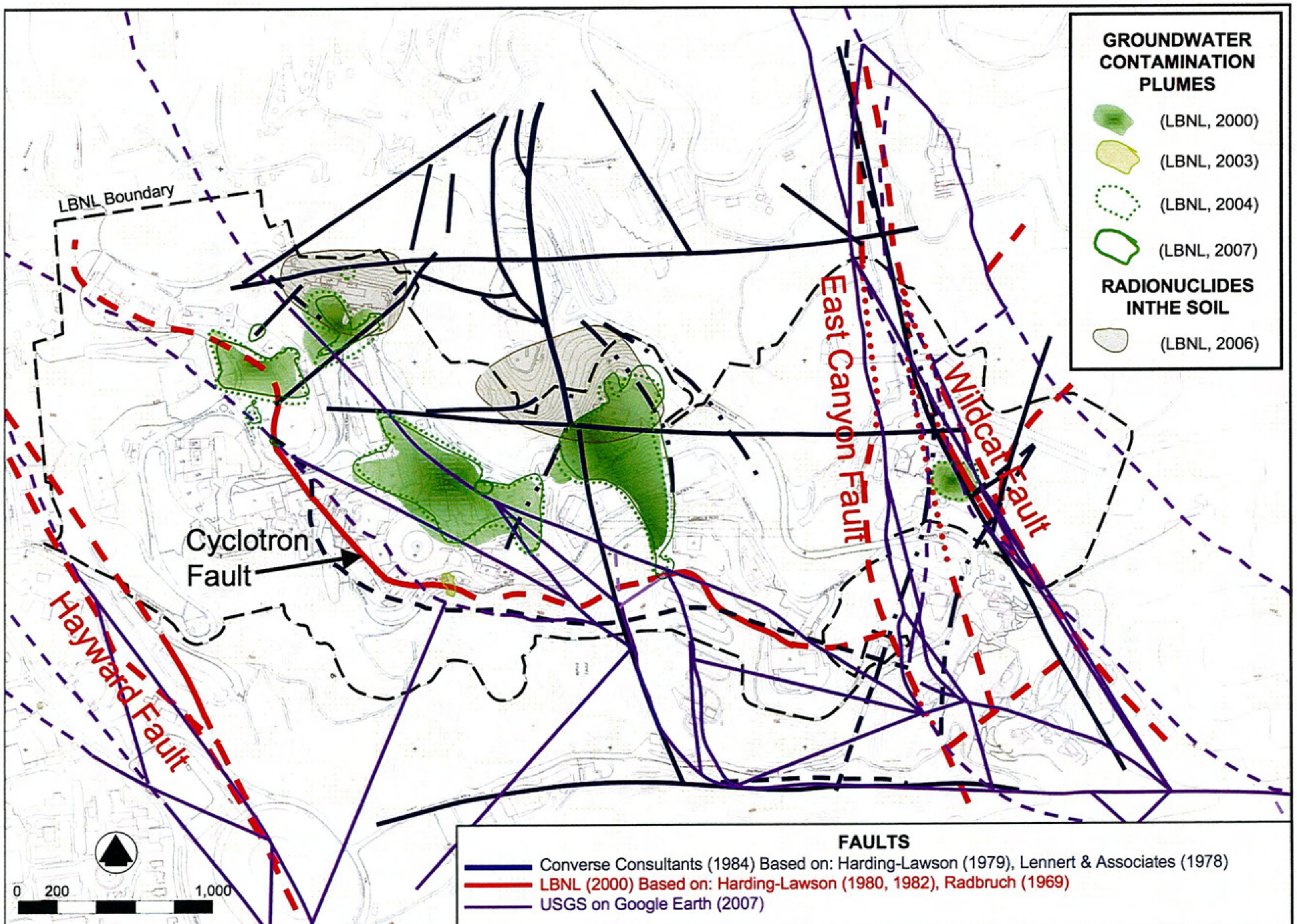

FIGURE 10. COMPILATION OF FAULT MAPPING AT LBNL IN STRAWBERRY CANYON RELATIVE TO SOIL AND GROUNDWATER CONTAMINANT PLUMES.

CMTW-38

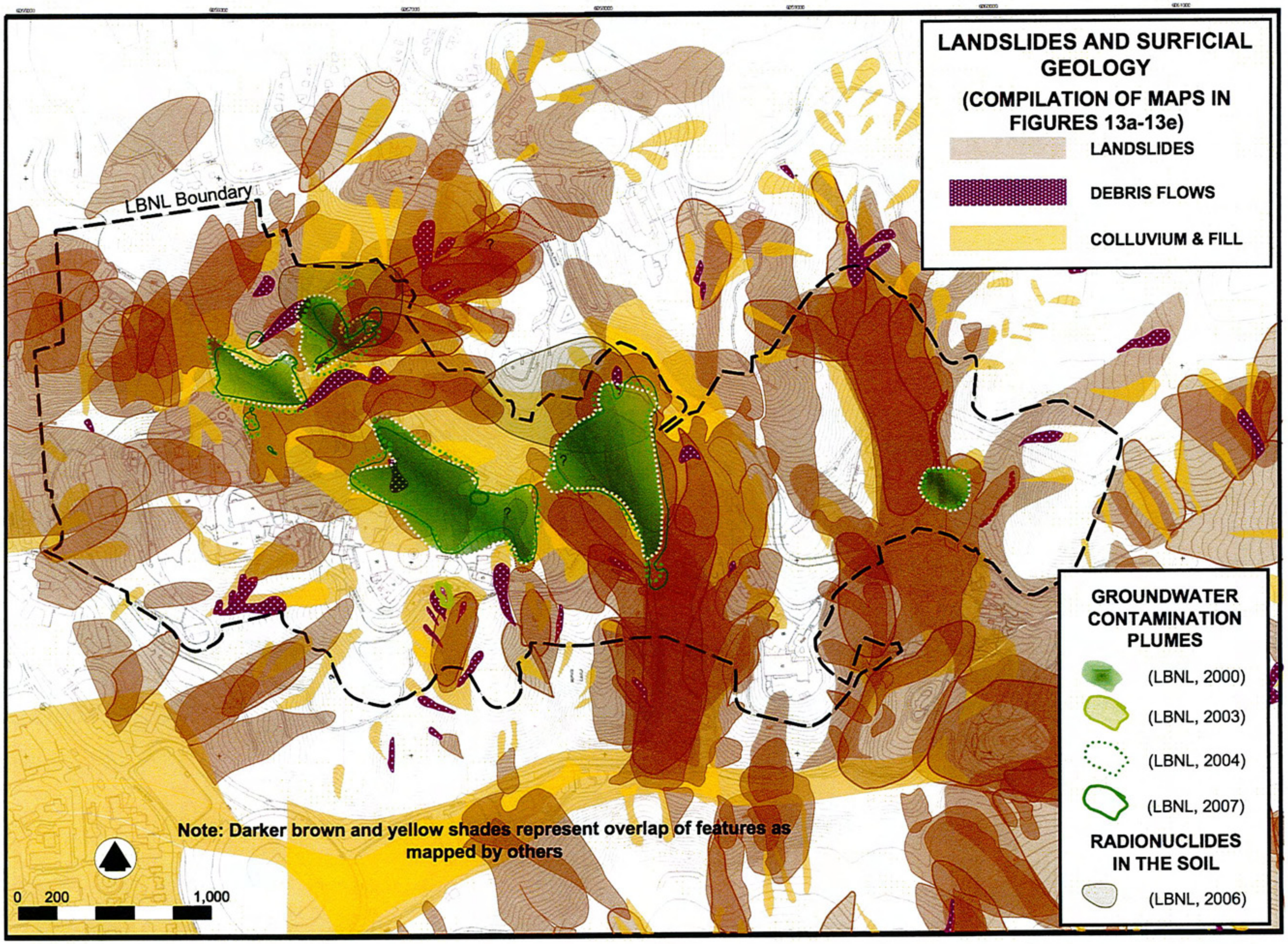

FIGURE 14. COMPILATION OF LANDSLIDE AND SURFICIAL GEOLOGY MAPS 13a-13f IN STRAWBERRY CANYON

CMTW-39

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78/83

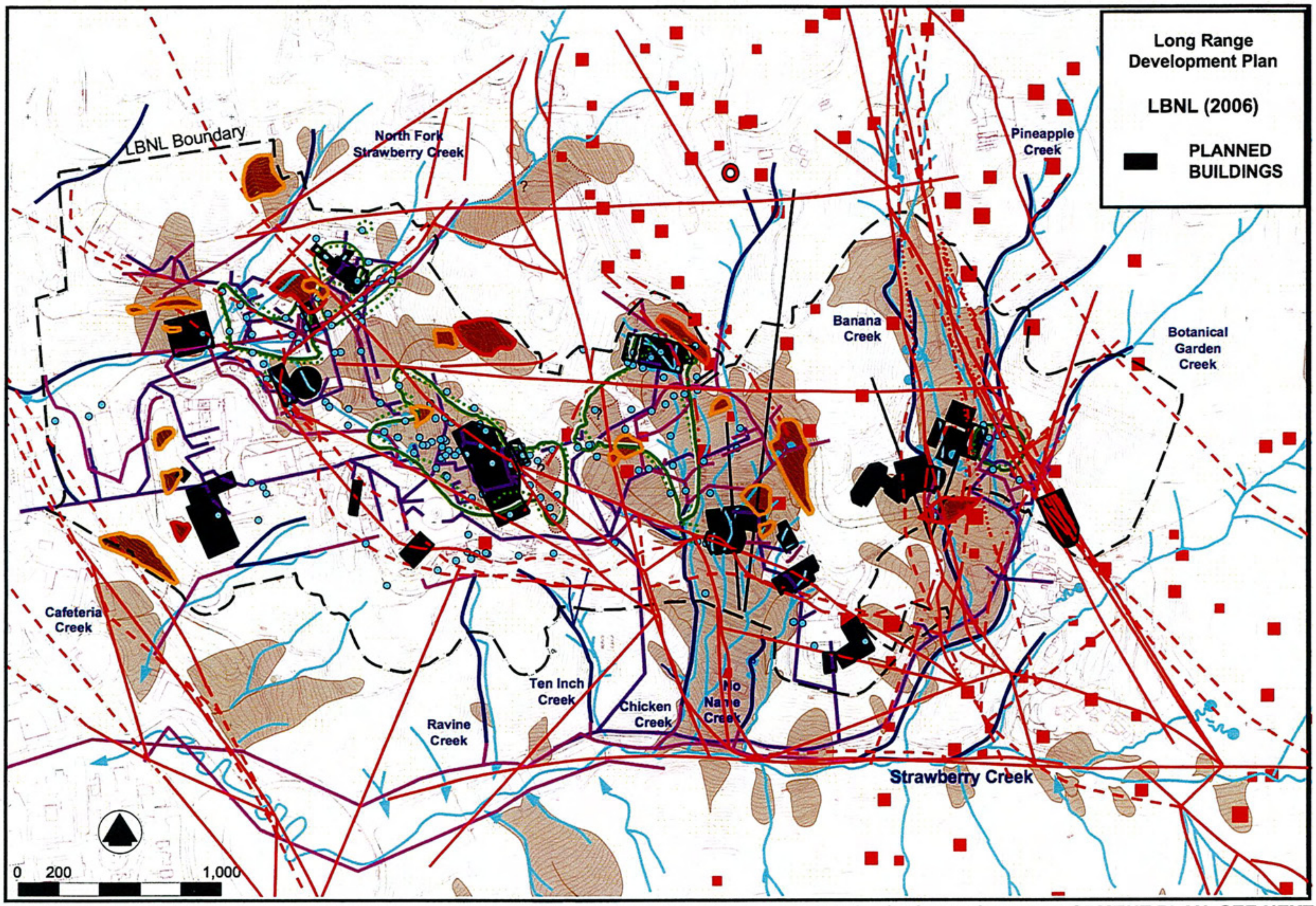


FIGURE 20a. VARIOUS COMPILED SITE CONDITIONS AT FUTURE BUILDING SITES OF LBNL'S LONG RANGE DEVELOPMENT PLAN. SEE NEXT PAGE FOR MAP LEGEND. NOTE THAT SOLID TO DASHED TO DOTTED RED FAULT LINES INDICATE DECREASING LEVELS OF CERTAINTY.

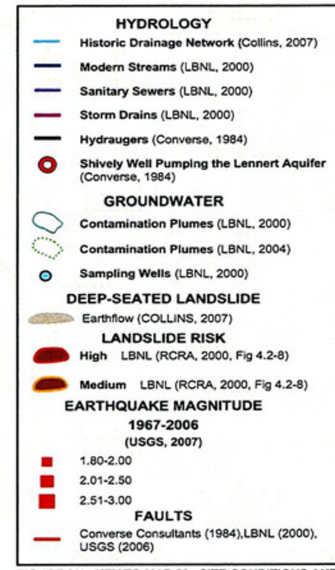


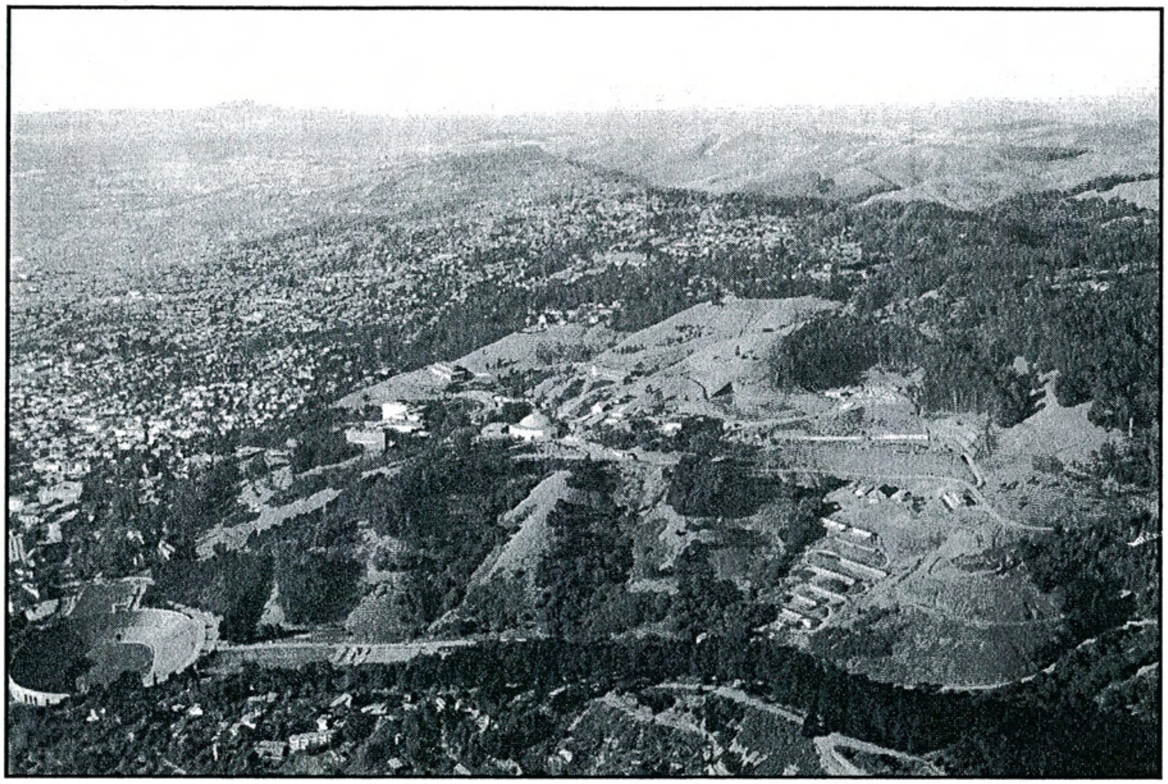
FIGURE 20b. KEY TO MAP 20a SITE CONDITIONS AND FUTURE BUILDING LOCATIONS

14.

CMTW-40

CONTAMINANT PLUMES OF THE LAWRENCE BERKELEY NATIONAL LABORATORY AND THEIR INTERRELATION TO FAULTS, LANDSLIDES, AND STREAMS IN STRAWBERRY CANYON, BERKELEY AND OAKLAND, CALIFORNIA

March 2007



Strawberry Creek Watershed ca. 1965

CMTW-41

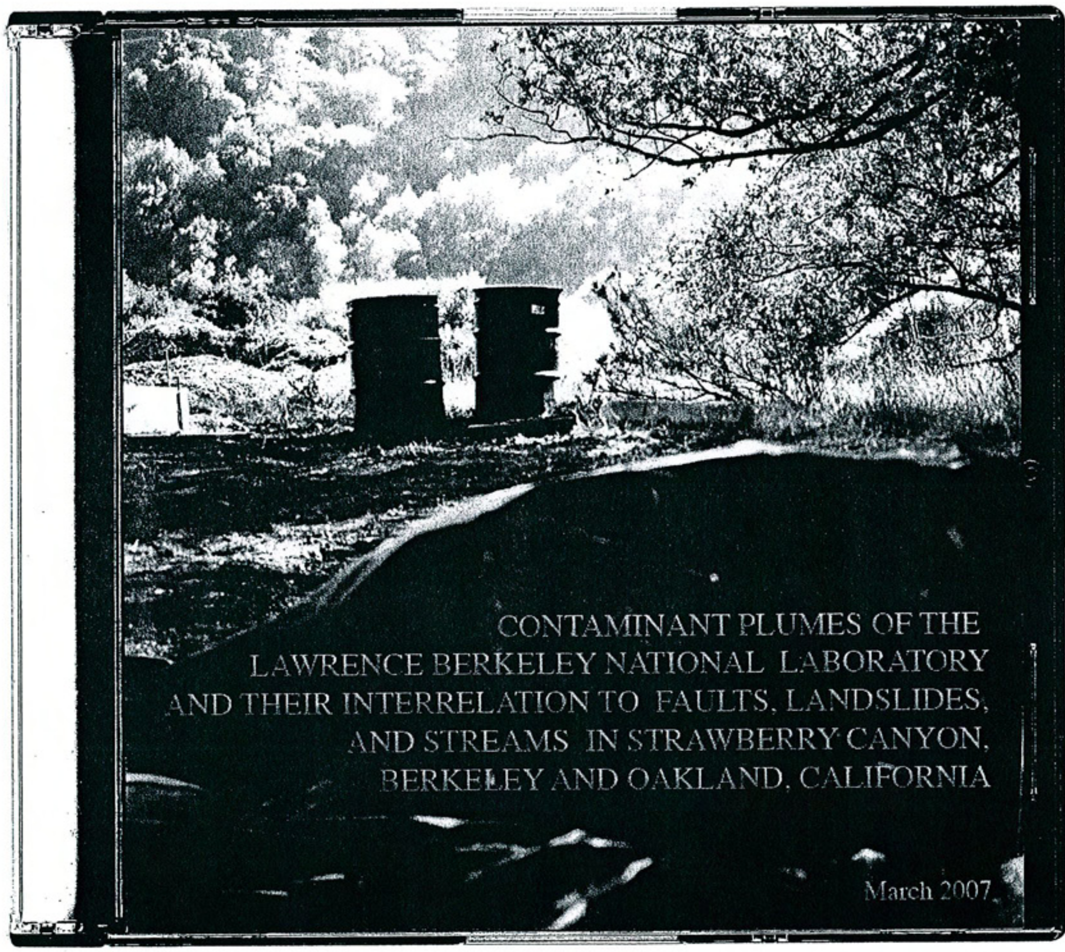
Laurel Collins, Geomorphologist
Watershed Sciences
1128 Fresno Ave
Berkeley, California 94707
collins@lmi.net

Watershed Sciences

for

Pamela Sihvola, Project Manager
Committee to Minimize Toxic Waste
P.O. Box 9646
Berkeley, California 94709

15.


CONTAMINANT PLUMES OF THE
LAWRENCE BERKELEY NATIONAL LABORATORY
AND THEIR INTERRELATION TO FAULTS, LANDSLIDES,
AND STREAMS IN STRAWBERRY CANYON,
BERKELEY AND OAKLAND, CALIFORNIA
March 2007

CMTW-42

KENNETH R. SCHMITZ
Associate Director — Grounds Services
Physical Plant Operations

UNIVERSITY OF CALIFORNIA
Office of Physical Resources
2000 Carleton Street
Berkeley, California 94720

(415) 642-6338
FAX (415) 643-7264

OFFICE OF PUBLIC INFORMATION

101 SPROUL HALL, BERKELEY, CA 94720
(415) 642-3734

5/9/84--McClendon--File #9070

FOR IMMEDIATE RELEASE

Berkeley--Centennial Drive, connecting the "main" University of California-Berkeley campus to hilltop facilities, will reopen tomorrow (Thurs., May 10) after an eight-month closing.

The reopening restores convenient access to U.C.'s Lawrence Hall of Science in plenty of time for the public to take advantage of its summer programs.

The road has been closed from just beyond the U.C. Botanical Garden in Strawberry Canyon since last September 19 to repair damage caused by two years of heavy rains and run-off.

Officials had expected the closure to last only 12 to 15 weeks, but wet weather caused many delays in the work, which included rebuilding a section of the road that had become unsafe.

At the Lawrence Hall of Science, five sessions of summer courses will be offered in computers, biology, chemistry, physics and astronomy for various age levels, ranging from age two through adulthood.

Other activities, such as film series and exhibits, will also be offered.

For information on Lawrence Hall of Science summer activities, call 642-5133.

-agl-

17.

81/83

CMTW-43

JOHN R. SHIVELY

CONSULTING ENGINEER

P.O. Box 7136
Berkeley, California 94707
(510) 531-1355

May 28, 1999

Dr. Charles Shank, Director
Lawrence Berkeley National Laboratory
1 Cyclotron Road, Mail Stop 50A-4119
Berkeley, California 94720

Re: City of Berkeley Fire Fighting System

Dear Dr. Shank:

Enclosed is a copy of my comments on the City of Berkeley's Draft Environmental Impact Report (DEIR) for the City's proposed Saltwater Fire Fighting System (SFFS). I propose an entirely different fire-fighting alternative, one that would be valuable to LBNL, referred to as the Hillwater Fire Fighting System. It would use a nearby existing source of hillwater rather than saltwater pumped from the Bay.

HFFS is of consequence to LBNL because it would enhance the fire fighting capability of the Lab's own fire protection. It would provide for reservoir impounded hillwater as a backup water source, should the normal water source fail during a major earthquake or a 1991 type conflagration. The HFFS alternative would utilize water from an existing hill area dewatering well located just south of the Space Sciences Laboratory. The water would be held in one or more large reservoirs.

I conceived of the idea of that vertical well, to intercept the hill-water that was causing the slides both inside and adjacent to LBNL, back in 1974.. I retained Civil Engineer B. J. Lennert to install this well. I was the Campus Principal Engineer in the campus Office of Architects and Engineers at that time. During August of 1974 a major hill slide had occurred inside LBNL. It broke a Lab building, took out a portion of a Lab road, and was threatening Lawrence Hall of Science. At the same time another slide was developing above the Lab's corporation yard, threatening the University's Centennial Drive. Lennert's attempts to stop the slides by dewatering the hill area with horizontal hydraugers weren't working. CMTW-44

The well apparently stopped both slides. Presumably the campus continues to pump the well to prevent future slides. Later in the 70's, after I had left the A & E Office, the campus fire marshal had a large reservoir tank installed near the well, kept full by the well, to provide the primary source of water for fighting fires in the relatively inaccessible areas of upper Strawberry Canyon. Unfortunately, sometime in the late 80's, the campus removed that reservoir, to make way for the construction of a new laboratory building. Since then the water produced by the well has been dumped straight into Strawberry Creek.

The HFFS alternative would not only enhance the Lab's own fire protection capability, it could have reliability and cost savings advantages for the City, compared to the saltwater proposal. LBNL's support is requested to encourage the City to conduct a feasibility study of the hillwater alternative. Please contact me if you wish more information about the hillwater alternative or the history of hill area slides.

Sincerely yours,

John R. Shively

John R. Shively, P.E.

Enclosure:

The same seismic and landslide hazards that afflict the B 85 site are present at the proposed 43,000 sq.ft. Bio Lab (General Purpose Laboratory) location, just some 200 yards downhill to the SE, on top of the Wildcat Canyon Fault.

The massive East Canyon Slide (see Figure 14.) extends all the way down to the bottom of Strawberry Canyon and continually undermines the stability of Centennial Drive, the only public (and emergency access) road through the Canyon. CMTW-45

We ask that you abandon this new construction project at the proposed East Canyon site and instead very seriously consider the UC owned Richmond Field Station, as an alternative location.

Indeed, the RFS, a prime Bay View property, must be considered as the future site for <u>all</u> LBNL Bio Science (Life Science) facilities, as well as for the Helios/EBI and CRT projects, in order to avoid the potential catastrophic failures predicted for the Strawberry Canyon Caldera during the next major earthquake - and to save publicly funded facilities, equipment and some 5000 human lives! CMTW-46

Sincerely,

Pamela Sihvola/CMTW
P.O. Box 9646
Berkeley, CA 94709

PS. Landslides in the Strawberry Canyon are triggered by heavy rains and underground water sources (during the dry season).

The attached UC Press release of May 9,1984 describes the closure of Centennial Drive for a period of eight months, due to heavy rains and run-off in one of the main landslide areas. (page 17)

Former UC Engineer John R. Shively describes a dry season landslide of August 1974, due to impounded hillwater of the Lennert Aquifer, as previous dewatering attempts by hydraugers had failed. (page 18) CMTW-47

The EIR/EIS reports must include rainfall data for at least the past 40 years for the highest LBNL locations/elevations as well as current data regarding the Lennert Aquifer and its impacts at LBNL.

SAVE STRAWBERRY CANYON
P.O. BOX 1234
BERKELEY, CALIFORNIA 94701

Via electronic mail to Planning@lbl.gov/
Signed hard copy to follow

Jeff Philliber
UC-LBNL Environmental Planner
One Cyclotron Road, MS 76-234A
Berkeley, CA 94720

Re: Comments on the Draft Environmental Impact Report for the Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2 Project

Dear Mr. Philliber,

SSC-1-1

Thank you for the opportunity to provide public comment on the Draft Environmental Impact Report (DEIR) for the Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2 (Seismic Phase 2) Project. These comments are submitted on behalf of Save Strawberry Canyon, a non-profit corporation, organized for purposes of protecting the upper watershed of Strawberry Creek, for purposes of protecting Strawberry Canyon from development which is inappropriate at this hillside location, and for purposes of educating the public toward these ends. www.savestrawberrycanyon.org

The proposed project location is the Lawrence Berkeley National Laboratory's main campus, which is a hillside setting that straddles two canyons, i.e. Strawberry Canyon and Blackberry Canyon. These canyons are in the scenic Berkeley and Oakland hills and between the spur ridges off the coastal ridge that parallels the San Francisco Bay. Within this setting, the project is in Blackberry Canyon which is the upper watershed of the North Fork of Strawberry Creek.

The area is complicated geologically with the Hayward Fault traversing the "western edge of the LBNL site as shown in Figure 4.5-1."[1] An ancient landslide area that could mobilize during an earthquake underlies the Hazardous Waste Storage Facility.[2]

[1] Seismic Phase 2 Project DEIR, page 4.5-9.
[2] Ibid. page 4.5-11.

The LBNL main campus is three miles east of Interstate 80[3] which is the western edge of Berkeley. This means that truck traffic must drive from one end of Berkeley to the other. By way of contrast, the Richmond Field Station alternative is very close to the freeway.

What the Seismic Phase 2 Project DEIR fails to mention is the extent to which truck traffic (demolition, construction, hazardous and toxic waste materials) uses two-lane residential roadways (e.g. upper Hearst Avenue) to access LBNL. Although the Project DEIR asserts that "(a)pproximately 15 local roadways provide access to LBNL…"[4], the Project DEIR fails to describe the routing in sufficient detail to illustrate the extent and nature of the access problem. For example, Figure 4.12-1 shows a partial route although the figure title [5] suggests otherwise. The Gayley Road, Rim Way, and Centennial Drive route lacks essential detail by not showing whether Centennial Drive traffic ends before reaching Grizzly Peak Boulevard, which is a residential two lane street at the top of the ridge. SSC-1-2

No mention is made of the residential land use along upper Hearst Avenue. The air quality impact analysis does not consider the urban environment on upper Hearst Avenue in which apartment buildings are built close to the street with very shallow setbacks. Neither does it analyze for air quality impacts to possible sensitive receptors living in the residential area. As such, air quality impacts from LBNL-related truck traffic are underestimated. SSC-1-3

LBNL is an approximately 200-acre site, and the Seismic Phase 2 Project includes demolition, seismic retrofitting, and new construction in already developed areas of the hillside. Although in-fill development and consolidation would seem to be all well and good, the unfortunate result of this demolition and new construction project is the tangible expression of LBNL's ongoing commitment to invest in this geologically sensitive and poorly accessed area. After the project is completed, for example, the research activities and occupants at an off-site space will move up the hill rather than the other way around. SSC-1-4

Several of the Project Objectives are written so as to guarantee that the Seismic Phase 2 Project will be located at this hillside location. For example, one of the Project Objectives is to locate life science research functions adjacent to the Nanosciences/Molecular Foundry Research cluster. Another is to "co-locate researchers and graduate students within a cluster of life science research facilities…" By having project objectives linked specifically to the location of the Molecular Foundry, for example, any potentially viable offsite alternative would be rejected out of hand. This is truly tragic given the availability of an underutilized industrial site owned by the university at the Richmond Field Station and where many life science research facilities could be consolidated. SSC-1-5

The already existing density of large research and development laboratories at the LBNL main hillside site is staggering. Rather than creating new campuses like was done when University of California at San Francisco (UCSF) outgrew the Parnassus Heights SSC-1-6

[3] Ibid. page 4.12-14.
[4] Ibid. page 4.12-14.
[5] Figure 4.12-1. City of Berkeley designated truck routes.

site, the LBNL in conjunction with the University of California at Berkeley (UCB) is intensifying development in the least accessible and the most seismically hazardous area of Berkeley. **SSC-1-6 cont.**

This is of grave concern because the Regents might be unaware of the cumulative development in the area, which includes two jurisdictions under their purview, i.e. not only LBNL but also the University of California at Berkeley (UCB). After all, the Regents certified *two* separate Long Range Development Plans, one for LBNL and another for UCB and did not have the benefit of a more coordinated approach to hillside expansion activities that commonly impact overlapping areas.

Poor coordination is evident from the Seismic Phase 2 Project DEIR's failure to identify major, reasonably foreseeable planned projects in the area that would occur within UCB's jurisdiction. Two significant examples are the Strawberry Canyon Vegetation Management Project http://www.fema.gov/library/viewRecord.do?id=3111 and the California Memorial Stadium: Seismic Corrections and West Program Improvements project. http://www.cp.berkeley.edu/CP/Projects/CalMemorialStadium_SSC/Enivornmental/Integrated_Projects_Addendum2_CMS_West.pdf Both are UCB projects that will have impacts to the LBNL as well as impacts in commonly shared areas, e.g. public, city roadways.

The Seismic Phase 2 Project DEIR identifies the following projects on the UCB Campus: South Campus Integrated Projects, Northeast Quadrant Science and Safety Projects, Helios, UC Berkeley Law School Infill, UC Berkeley Naval Architecture Restoration and Blum Center, and the Warren Hall Replacement. However, left out is the Addendum to the Southeast Campus Integrated Projects EIR. Approved by the Regents in January 2010 and *before* the Notice of Availability of the Seismic Phase 2 Project DEIR, the reasonably foreseeable project changes to the SCIP EIR include the following: (1) an Athletic Service Center of approximately 15,000 square feet, (2) lowering of the playing field an additional 2 feet. Although reasonably foreseeable and already approved by the Regents, these are changes to SCIP not mentioned in the Seismic Phase 2 Project DEIR. **SSC-1-7**

The Strawberry Canyon Vegetation Management Project was also left out of the analysis and even though the project would involve removal of 10,000 trees in 45 acres in Strawberry Canyon on lands adjacent to LBNL. A draft Environmental Assessment for the Federal Emergency Management Agency grant has been prepared. The project is vast in scope and reasonably foreseeable.

The cumulative impact analysis of the Seismic Phase 2 Project DEIR was deficient by failing to identify all reasonably foreseeable planned projects in the area. The stadium-related projects might generate additional construction and demolition truck traffic, and thus generate even more traffic than anticipated in the supplement to the 2006 LBNL LRDP EIR with respect to one traffic impact and more traffic than anticipated in the Seismic Phase 2 Project DEIR which identified one significant unavoidable traffic impact. The deforestation/vegetation management project might interact with seismic hazards, e.g. landslides, that characterize the area and thus there would be unanalyzed cumulative geological impacts, among other impacts not identified by virtue of the project not being identified in the first place. SSC-1-7 cont.

Neither does the Seismic Phase 2 Project DEIR adequately analyze geological impacts in this fault ridden area. Information provided in a separate comment letter from Garniss Curtiss, Professor Emeritus of Geology at UCB, will show the extent to which the project area is ridden with hazardous geological conditions. SSC-1-8

Of concern is the Seismic Phase 2 Project DEIR's failure to adequately inform the public in this serious matter.

- For example the study by William Lettis and Associates regarding the Building 25/25B site and the location of the proposed General Purpose Lab is referenced but not included in the Appendix.[6] SSC-1-9
- For example, the Geologic Map of the East Canyon Area (Figure 4.5-2) includes the General Purpose Lab but omits Building 85/85A, which is the Hazardous Waste Handling Facility, the building which is on top of the landslide area and the focus of the seismic mitigation part of the Seismic Phase 2 Project EIR. SSC-1-10
- The geotechnical investigations which are conducted are shallow in scope and insufficient to document the geological conditions of the area (see comment letter from Dr. Curtis). It should be noted toward this end that apparently inferior geotechnical studies prepared in 1994 for purposes of constructing Building 85 did not reveal the landslide area later identified in 1996.[7] SSC-1-11
- Although the Seismic Phase 2 DEIR now documents the ancient landslide deposits upon which the Hazardous Waste Handling Facility/Building 85 sits, and although the Seismic Phase 2 DEIR also acknowledges that the landslide deposits could become mobilized in the event of a major earthquake, the DEIR underestimates seismic impacts as less than significant by insufficiently mitigating this hazard with a below-grade system of pier foundations and tiebacks. SSC-1-12

Finally, we wish to express our disappointment in the delay in issuing the Draft Environmental Assessment on this project. The Demolition, Retrofit, and Building DEIR announced the EA would be circulated *concurrently* with the DEIR comment period.[8] Moreover, the Department of Energy (DOE) issued a Notice of Intent to Prepare an Environmental Assessment as long ago as 11/25/08. We would fully expect the NEPA review process to be completed before demolition, retrofitting, or construction begins on this project. SSC-1-13

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[6] "Lettis and Associates (2009) concluded that the evidence was equivocal as to whether a paleolandslide existed beneath Building 25 or not. However, if the landslide does exist, it is geologically stable and has not moved in thousands of years." Seismic Phase 2 Project DEIR, p. 4.5-20. This was the only geotechnical study referenced in the DEIR that was not included in the Appendix.
[7] Seismic Phase 2 Project DEIR, pages 4.5-11, 12.
[8] Draft EIR for Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase Project, p. I-4.

In closing, the Seismic Phase 2 Project DEIR gives short shrift to the environmental problems attendant to demolition and construction activities and ongoing operations at LBNL's main campus. Save Strawberry Canyon urgently requests that you give more serious consideration to consolidating research and development at a satellite campus and develop an appropriate plan forthwith.

Thanks in advance for your thoughtful response to our comments.

SSC-1-14

Yours sincerely,

Janice Thomas
Secretary, Save Strawberry Canyon

SAVE STRAWBERRY CANYON

P.O. BOX 1234

BERKELEY, CALIFORNIA 94701

Via electronic mail to Planning@lbl.gov/
Signed hard copy to follow

Jeff Philliber
UC-LBNL Environmental Planner
One Cyclotron Road, MS 76-234A
Berkeley, CA 94720

Re: Comments on the Draft Environmental Impact Report for the Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2 Project

Dear Mr. Philliber,

SSC-2-1

Thank you for the opportunity to provide public comment on the Draft Environmental Impact Report (DEIR) for the Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2 (Seismic Phase 2) Project. These comments are submitted on behalf of Save Strawberry Canyon, a non-profit corporation, organized for purposes of protecting the upper watershed of Strawberry Creek, for purposes of protecting Strawberry Canyon from development which is inappropriate at this hillside location, and for purposes of educating the public toward these ends. www.savestrawberrycanyon.org

The proposed project location is the Lawrence Berkeley National Laboratory's main campus, which is a hillside setting that straddles two canyons, i.e. Strawberry Canyon and Blackberry Canyon. These canyons are in the scenic Berkeley and Oakland hills and between the spur ridges off the coastal ridge that parallels the San Francisco Bay. Within this setting, the project is in Blackberry Canyon which is the upper watershed of the North Fork of Strawberry Creek.

The area is complicated geologically with the Hayward Fault traversing the "western edge of the LBNL site as shown in Figure 4.5-1."[1] An ancient landslide area that could mobilize during an earthquake underlies the Hazardous Waste Storage Facility.[2]

[1] Seismic Phase 2 Project DEIR, page 4.5-9.
[2] Ibid. page 4.5-11.

The LBNL main campus is three miles east of Interstate 80[3] which is the western edge of Berkeley. This means that truck traffic must drive from one end of Berkeley to the other. By way of contrast, the Richmond Field Station alternative is very close to the freeway.

What the Seismic Phase 2 Project DEIR fails to mention is the extent to which truck traffic (demolition, construction, hazardous and toxic waste materials) uses two-lane residential roadways (e.g. upper Hearst Avenue) to access LBNL. Although the Project DEIR asserts that "(a)pproximately 15 local roadways provide access to LBNL…"[4], the Project DEIR fails to describe the routing in sufficient detail to illustrate the extent and nature of the access problem. For example, Figure 4.12-1 shows a partial route although the figure title [5] suggests otherwise. The Gayley Road, Rim Way, and Centennial Drive route lacks essential detail by not showing whether Centennial Drive traffic ends before reaching Grizzly Peak Boulevard, which is a residential two lane street at the top of the ridge.

No mention is made of the residential land use along upper Hearst Avenue. The air quality impact analysis does not consider the urban environment on upper Hearst Avenue in which apartment buildings are built close to the street with very shallow setbacks. Neither does it analyze for air quality impacts to possible sensitive receptors living in the residential area. As such, air quality impacts from LBNL-related truck traffic are underestimated.

LBNL is an approximately 200-acre site, and the Seismic Phase 2 Project includes demolition, seismic retrofitting, and new construction in already developed areas of the hillside. Although in-fill development and consolidation would seem to be all well and good, the unfortunate result of this demolition and new construction project is the tangible expression of LBNL's ongoing commitment to invest in this geologically sensitive and poorly accessed area. After the project is completed, for example, the research activities and occupants at an off-site space will move up the hill rather than the other way around. **SSC-2-1 cont.**

Several of the Project Objectives are written so as to guarantee that the Seismic Phase 2 Project will be located at this hillside location. For example, one of the Project Objectives is to locate life science research functions adjacent to the Nanosciences/Molecular Foundry Research cluster. Another is to "co-locate researchers and graduate students within a cluster of life science research facilities…" By having project objectives linked specifically to the location of the Molecular Foundry, for example, any potentially viable offsite alternative would be rejected out of hand. This is truly tragic given the availability of an underutilized industrial site owned by the university at the Richmond Field Station and where many life science research facilities could be consolidated.

The already existing density of large research and development laboratories at the LBNL main hillside site is staggering. Rather than creating new campuses like was done when University of California at San Francisco (UCSF) outgrew the Parnassus Heights

[3] Ibid. page 4.12-14.
[4] Ibid. page 4.12-14.
[5] Figure 4.12-1. City of Berkeley designated truck routes.

site, the LBNL in conjunction with the University of California at Berkeley (UCB) is intensifying development in the least accessible and the most seismically hazardous area of Berkeley.

This is of grave concern because the Regents might be unaware of the cumulative development in the area, which includes two jurisdictions under their purview, i.e. not only LBNL but also the University of California at Berkeley (UCB). After all, the Regents certified *two* separate Long Range Development Plans, one for LBNL and another for UCB and did not have the benefit of a more coordinated approach to hillside expansion activities that commonly impact overlapping areas.

Poor coordination is evident from the Seismic Phase 2 Project DEIR's failure to identify major, reasonably foreseeable planned projects in the area that would occur within UCB's jurisdiction. Two significant examples are the Strawberry Canyon Vegetation Management Project http://www.fema.gov/library/viewRecord.do?id=3111 and the California Memorial Stadium: Seismic Corrections and West Program Improvements project.
http://www.cp.berkeley.edu/CP/Projects/CalMemorialStadium_SSC/Enivornmental/Integrated_Projects_Addendum2_CMS_West.pdf Both are UCB projects that will have impacts to the LBNL as well as impacts in commonly shared areas, e.g. public, city roadways.

The Seismic Phase 2 Project DEIR identifies the following projects on the UCB Campus: South Campus Integrated Projects, Northeast Quadrant Science and Safety Projects, Helios, UC Berkeley Law School Infill, UC Berkeley Naval Architecture Restoration and Blum Center, and the Warren Hall Replacement. However, left out is the Addendum to the Southeast Campus Integrated Projects EIR. Approved by the Regents in January 2010 and *before* the Notice of Availability of the Seismic Phase 2 Project DEIR, the reasonably foreseeable project changes to the SCIP EIR include the following: (1) an Athletic Service Center of approximately 15,000 square feet, (2) lowering of the playing field an additional 2 feet. Although reasonably foreseeable and already approved by the Regents, these are changes to SCIP not mentioned in the Seismic Phase 2 Project DEIR.

SSC-2-1 cont.

The Strawberry Canyon Vegetation Management Project was also left out of the analysis and even though the project would involve removal of 10,000 trees in 45 acres in Strawberry Canyon on lands adjacent to LBNL. A draft Environmental Assessment for the Federal Emergency Management Agency grant has been prepared. The project is vast in scope and reasonably foreseeable.

The cumulative impact analysis of the Seismic Phase 2 Project DEIR was deficient by failing to identify all reasonably foreseeable planned projects in the area. The stadium-related projects might generate additional construction and demolition truck traffic, and thus generate even more traffic than anticipated in the supplement to the 2006 LBNL LRDP EIR with respect to one traffic impact and more traffic than anticipated in the Seismic Phase 2 Project DEIR which identified one significant unavoidable traffic impact. The deforestation/vegetation management project might interact with seismic hazards, e.g. landslides, that characterize the area and thus there would be unanalyzed cumulative geological impacts, among other impacts not identified by virtue of the project not being identified in the first place.

Neither does the Seismic Phase 2 Project DEIR adequately analyze geological impacts in this fault ridden area. Information provided in a separate comment letter from Garniss Curtiss, Professor Emeritus of Geology at UCB, will show the extent to which the project area is ridden with hazardous geological conditions.

Of concern is the Seismic Phase 2 Project DEIR's failure to adequately inform the public in this serious matter.

- For example the study by William Lettis and Associates regarding the Building 25/25B site and the location of the proposed General Purpose Lab is referenced but not included in the Appendix.[6]
- For example, the Geologic Map of the East Canyon Area (Figure 4.5-2) includes the General Purpose Lab but omits Building 85/85A, which is the Hazardous Waste Handling Facility, the building which is on top of the landslide area and the focus of the seismic mitigation part of the Seismic Phase 2 Project EIR.
- The geotechnical investigations which are conducted are shallow in scope and insufficient to document the geological conditions of the area (see comment letter from Dr. Curtis). It should be noted toward this end that apparently inferior geotechnical studies prepared in 1994 for purposes of constructing Building 85 did not reveal the landslide area later identified in 1996.[7]
- Although the Seismic Phase 2 DEIR now documents the ancient landslide deposits upon which the Hazardous Waste Handling Facility/Building 85 sits, and although the Seismic Phase 2 DEIR also acknowledges that the landslide deposits could become mobilized in the event of a major earthquake, the DEIR underestimates seismic impacts as less than significant by insufficiently mitigating this hazard with a below-grade system of pier foundations and tiebacks.

SSC-2-1 cont.

Finally, we wish to express our disappointment in the delay in issuing the Draft Environmental Assessment on this project. The Demolition, Retrofit, and Building DEIR announced the EA would be circulated *concurrently* with the DEIR comment period.[8] Moreover, the Department of Energy (DOE) issued a Notice of Intent to Prepare an Environmental Assessment as long ago as 11/25/08. We would fully expect the NEPA review process to be completed before demolition, retrofitting, or construction begins on this project.

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[6] "Lettis and Associates (2009) concluded that the evidence was equivocal as to whether a paleolandslide existed beneath Building 25 or not. However, if the landslide does exist, it is geologically stable and has not moved in thousands of years." Seismic Phase 2 Project DEIR, p. 4.5-20. This was the only geotechnical study referenced in the DEIR that was not included in the Appendix.

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In closing, the Seismic Phase 2 Project DEIR gives short shrift to the environmental problems attendant to demolition and construction activities and ongoing operations at LBNL's main campus. Save Strawberry Canyon urgently requests that you give more serious consideration to consolidating research and development at a satellite campus and develop an appropriate plan forthwith.

Thanks in advance for your thoughtful response to our comments.

SSC-2-1 cont.

Yours sincerely,

Janice Thomas
Secretary, Save Strawberry Canyon

COMMENT LETTER GB

March 13, 2010

Jeff Philliber , UC-LBNL Environmental Planner
Lawrence Berkeley National Laboratory
One Cyclotron Road, MS 76-234A
Berkeley, CA 94720

GB-1

Re: DEIR for Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2 Project.

Dear Mr. Philliber,

My comments are directed to the Seismic strenghtening of the Hazardous Waste Handling Facility (HWHF) consisting of buildings 85, 85A, 85B, a yard and prefabricated units. To be be brief, the Seismic Life Safety of the HWHF is likely also brief. In 1989 it was predicted "The Big One" will occur on the Hayward Fault within 30 years; that's just 9 years to go!

The replacement HWHF should never have been built in its present location, situated behind Lawrence Berkeley Lab's Strawberry Canyon gate in Oakland on the East Canyon "Feature", a branch of the Wildcat Fault. In order to build the Non-Nuclear Facility, for the storage and treatment of radioactive and hazardous waste, it was necessary to do at least 4 things:

1. Ignore the Wildcat and East Canyon Faults and any branch "Features" upon which the Hazardous Waste Handling Facility now sits.

2. Ignore the safety implications of slope stability problems.
   The Lab ignored slope stability problems despite:

   a) its own revelation in "Response to Public Comments" IS-7 (LBNL, April 1997) which indicated that a slide 50 feet long by 100 feet wide occurred along the access road to the site of the replacement HWHF in the winter of 1994/95. (Not an ancient slide !)

   b) the knowledge, provided in Public Comment, of a UC Berkeley press release which reported that Centennial Drive, which connects to the access road to the HWHF, was closed for 8 months in 1983/84 due to a huge slide. (Press release enclosed).

GB-2

3. Fail to do a Supplementary EIR when 2 major changes were made to the original EIR:

   a) First; building a Non-Nuclear Facility for storage and treatment of radioactive waste and hazardous waste because Department of Energy's (DOE) Western Division "determined that the benefits of constructing a Nuclear Facility do not justify the additional costs," (April 5, 1994 memo to Joe Boda from Alex Dong - enclosed). Surely a Nuclear Facility has more safety features than a Non-Nuclear Facility. Is safety not worth the cost?

   In order to fall below the threshold for a Category 3 Non-Reactor Nuclear Facility, the one the original EIR indicated was to be built, the Tritium Focus Group was actually able to get the DOE to change the threshold from 1000 curies (Ci) to 16,600 Ci! (U.S. Dept. of Energy, DOE Standard "Hazard Categorization and Accident Analysis...", DOE STD-1027-92, Dec. 1992, Change Notice no.1, September 1997 - See Attach. I pp A-10, for Isotope H3, and A 12 footnote * - enclosed)

   b) Second: moving the fence-line a considerable distance from the then existing fence-line around the HWHF in order to declare they are not exceeding the allowable radiation dose to the public. This would not be possible without a public hearing and eminent domain proceedings if private property, rather than UC Regents' property were located outside the existing fence-line. (See enclosed: 7/21/99 letter to Watson Gin, DTSC from G. Bernardi CMTW: 2/20/96 memo from G, Weinstein to D.Balgobin, LBNL : 7/14/94 letter to G. Bernardi from T. Powell, LBNL; 3/28/96 memo to H. Mitchell, UC and K. Berkner, LBNL from L. Bean, UC and R. Camper, LBNL)

I don't find it strange that the safety of the public and employees was not the paramount concern, and that CEQA was violated and radiation thresholds were changed to fulfill the headstrong plans and cost saving motives of the HWHF decision makers as this was done under the tutelage of the University of California, the manager of the Lab. One can see parallels to UC's actions regarding the Memorial Stadium, wherein UC claimed it could dispense with the supporting concrete pier footing tied into the stadium, when the Judge ruled it violated the Alquist-Priolo law. Next, UC saw to it that the Stadium and other State buildings be totally exempted from Alquist-Priolo through the Omnibus Bill (2009). Such amendments are required to be non-controversial!

LBNL has expressed concern (DEIR Vol. I. 1/29/10 - p. 3-17) that the HWHF (Bldg 85/85A and 85B) is in the area of the official State of California Earthquake Induced Landslide Hazard Zone and that presents a hazard to the HWHF in case a landslide was mobilized in the event of a major earthquake. GB-3

A sincere concern would mean compliance with the Alquist-Priolo Act. Do the cost and specifications of the system of concrete pier foundations and tiebacks to stabilize Bldgs. 85/85A comply with Alquist-Priolo? If not, does this mean safety conscious members of the public and potential employees need to avoid both State and Federal government buildings in California? GB-4

GB-5

Sincerely,

Gene Bernardi

Gene Bernardi
9 Arden Road
Berkeley, CA 94704

Enclosures: 15 pages

KENNETH R. SCHMITZ
Associate Director — Grounds Services
Physical Plant Operations

NIVERSITY OF CALIFORNIA
fice of Physical Resources
00 Carleton Street
rkeley, California 94720
(415) 642-6338
FAX (415) 643-7264

OFFICE OF PUBLIC INFORMATION

101 SPROUL HALL, BERKELEY, CA 9472
(415) 642-3734

5/9/84--McClendon--File #9070

Info to RWW WML

FOR IMMEDIATE RELEASE

Berkeley--Centennial Drive, connecting the "main" University of California-Berkeley campus to hilltop facilities, will reopen tomorrow (Thurs., May 10) after an eight-month closing.

The reopening restores convenient access to U.C.'s Lawrence Hall of Science in plenty of time for the public to take advantage of its summer programs.

GB-6

The road has been closed from just beyond the U.C. Botanical Garden in Strawberry Canyon since last September 19 to repair damage caused by two years of heavy rains and run-off.

Officials had expected the closure to last only 12 to 15 weeks, but wet weather caused many delays in the work, which included rebuilding a section of the road that had become unsafe.

At the Lawrence Hall of Science, five sessions of summer courses will be offered in computers, biology, chemistry, physics and astronomy for various age levels, ranging from age two through adulthood.

Other activities, such as film series and exhibits, will also be offered.

For information on Lawrence Hall of Science summer activities, call 642-5133.

-agl-

APR 1 2 1994

United States Government Department of Energy

memorandum

DATE: April 5, 1994

cc: T. WAN

REPLY TO ATTN OF: Oakland Operations Office (WM)

SUBJECT: Classification of the LBL Hazardous Waste Handling Facility

TO: Joe Boda, Director of Western Operations Division, EM-322

We are writing to inform you of the Oakland Operations Office decision to classify the new Hazardous Waste Handling Facility at Lawrence Berkeley Laboratory as a Non-Nuclear Facility. This decision has been concurred upon by LBL and the DOE-LBL Energy Research Site Office.

LBL has completed a review of current inventories and proposed generation rates of radioactive and mixed waste and concluded that this facility will operate below Category 3 Non-Reactor Nuclear Facility thresholds as prescribed in DOE STD-1027-92. In addition, we have reviewed the additional incremental costs involved in constructing and operating a Category 3 Non-Reactor Nuclear Facility and have determined that the benefits of constructing a Nuclear Facility do not justify these additional costs.

We have received assurance from the DOE-LBL Site Office that they will closely monitor the waste generators to keep quantities within acceptable limits. In addition, we will establish waste acceptance criteria for the HWHF and monitor the inventory against these criteria. We are now proceeding with construction of the HWHF as designed under the general criteria of DOE Order 6430.1A, incorporating special features for areas where radioactivity is handled.

Should you have any questions concerning this matter, please contact Dan Nakahara at (510) 637-1640.

Sincerely,

Alex E. Dong

Alex E. Dong, Acting Director
Waste Management Division

GB-7

Post-it® Fax Note 7671

To Nancy Shepard	Date 4/1/97 # of pages ▸
Co./Dept.	From J Bartley
Phone #	Co.
Fax #	Phone #
	Fax #

TS

NOT MEASUREMENT SENSITIVE

DOE-STD-1027-92
December 1992

CHANGE NOTICE NO.1
September 1997

DOE STANDARD

HAZARD CATEGORIZATION AND ACCIDENT ANALYSIS TECHNIQUES FOR COMPLIANCE WITH DOE ORDER 5480.23, NUCLEAR SAFETY ANALYSIS REPORTS

GB-7
cont.

U.S. Department of Energy
Washington, D.C. 20585

AREA SAFT

Table A.1 Thresholds for Radionuclides

Isotope	Category 2 [1] Curies	Threshold Grams	Category 3 [2] Curies	Threshold Grams
H-3	3.0E+05	3.0E+01	1.6E+04*	1.6E+00*
C-14	1.4E+06	3.1E+05	4.2E+02	9.4E+01
Na-22	6.3E+03	1.0E+00	2.4E+02	3.8E-02
P-32	4.4E+03	1.5E-04	1.2E+01	4.2E-05
P-33	3.0E+04	1.9E-01	9.4E+01	6.0E-04
P-32, acid**	2.2E+06	7.7E-02	1.2E+01	4.2E-05
P-33, acid**	1.5E+07	9.6E+01	9.4E+01	6.0E-04
S-35	2.5E+04	5.8E-01	7.8E+01	1.8E-03
Cl-36	1.4E+03	4.3E+04	3.4E+02	1.0E+04
K-40	4.7E+03	6.8E+08	1.7E+02	2.4E+07
Ca-45	4.7E+06	2.6E+02	1.1E+03	6.2E-02
Ca-47	4.8E+06	7.8E+00	7.0E+02	1.1E-03
Sc-46	1.4E+06	4.0E+01	3.6E+02	1.1E-02
Ti-44	3.2E+04	1.9E+02	6.2E+01	3.6E-01
V-48	3.0E+06	1.8E+01	6.4E+02	3.8E-03
Cr-51	1.0E+08	1.1E+03	2.2E+04	2.4E-01
Mn-52	4.0E+06	8.8E+00	3.4E+02	7.6E-04
Fe-55	1.1E+07	4.6E+03	5.4E+03	2.2E+00
Fe-59	1.8E+06	3.7E+01	6.0E+02	1.2E+02
Co-60	1.9E+05	1.7E+02	2.8E+02	2.5E-01
Ni-63	4.5E+06	8.0E+04	5.4E+03	9.5E+01
Zn-65	1.6E+06	1.9E+02	2.4E+02	2.9E-02
Ge-68	5.8E+05	8.8E+01	1.0E+03	1.5E-01
Se-75	3.4E+05	2.4E+01	3.2E+02	2.2E-02
Kr-85	2.8E+07	7.2E+04	2.0E+04	5.1E+01
Sr-89	7.7E+05	2.7E+01	3.4E+02	1.2E-02
Sr-90	2.2E+04	1.6E+02	1.6E+01	1.2E-01
Y-91	6.5E+05	2.7E+01	3.6E+02	1.5E-02
Zr-93	8.9E+04	3.6E+07	6.2E+01	2.5E+04
Zr-95	1.5E+06	6.9E+01	7.0E+02	3.3E-02
Nb-94	8.6E+04	4.6E+05	2.0E+02	1.1E+03
Mo-99	7.8E+06	1.6E+01	3.4E+03	7.1E-03
Tc-99	3.8E+06	2.3E+08	1.7E+03	1.0E+05
Ru-106	6.5E+03	1.9E+00	1.0E+02	3.0E-02
Ag-110m	5.3E+05	1.1E+02	2.6E+02	5.5E-02
Cd-109	2.9E+05	1.1E+02	1.8E+02	7.0E-02
Cd-113	1.8E+04	5.3E+16	1.1E+01	3.2E+13
In-114m	3.7E+05	1.6E+01	2.2E+02	9.5E-03
Sn-113	3.2E+06	3.2E+02	1.3E+03	1.3E-01

GB-7
cont.

Isotope	Category 2 Curies	Threshold Grams	Category 3 Curies	Threshold Grams
U-233	2.2E+02***	2.3E+04***	4.2E+00	4.4E+02
U-234	2.2E+02	3.5E+04	4.2E+00	6.7E+02
U-235	2.4E+02***	1.1E+08***	4.2E+00	1.9E+06
U-238	2.4E+02	7.1E+08	4.2E+00	1.3E+07
Np-237	5.8E+01	8.3E+04	4.2E-01	6.0E+02
Np-238	9.1E+05	3.5E+00	1.3E+03	5.0E-03
Pu-238	6.2E+01	3.6E+00	6.2E-01	3.6E-02
Pu-239	5.6E+01***	9.0E+02***	5.2E-01	8.4E+00
Pu-241	2.9E+03	2.8E+01	3.2E+01	3.1E-01
Am-241	5.5E+01	1.6E+01	5.2E-01	1.5E-01
Am-242m	5.6E+01	5.8E+00	5.2E-01	5.3E-02
Am-243	5.5E+01	2.8E+02	5.2E-01	2.6E+00
Cm-242	1.7E+03	5.1E-01	3.2E+01	9.7E-03
Cm-245	5.3E+01	3.1E+02	5.2E-01	3.0E+00
Cf-252	2.2E+02	4.1E-01	3.2E+00	5.9E-03

GB-7 cont.

1 For isotopes not listed below, users may refer to LA-12846-MS, Specific Activities and DOE-STD-1027-92 Hazard Category 2 Thresholds, LANL Fact Sheet or to 10 CFR 30.72, Schedule C and adjust the values consistent with the X/Q value described in Attachment 1 of this Standard. (Note that although LA-12846-MS misstates the Category 2 threshold criterion, its use of the proper X/Q negates any effect of the misstatement. See "Radiological Criteria, p A-3 and Meteorological Conditions, p A-7 for clarification)

Any other beta-gamma emitter - 4.3E+05 Ci
Mixed fission products - 1.0E+03 Ci
Any other alpha emitter - 5.5E+01 Ci

2 For isotopes not listed below, users may refer to LA-12981-MS, Table of DOE-STD-1027-92 Hazard Category 3 Threshold Quantities for the ICRP-30 List of 757 Radionuclides, LANL Fact Sheet for threshold quantities of any isotopes of interest.

* At the recommendation of the Tritium Focus Group, the Category 3 tritium threshold value has been increased from 1.0E+03 Ci and 1.0E-01 grams to 1.6E+04 Ci and 1.6E+00 grams, consistent with the methodology of EPA used for the other nuclides.

** Provided as an example to indicate that when a substance such as P_{32} is used in a solution (i.e., phosphoric acid) for experimentation, medical treatment, etc., it should no longer be considered as highly volatile/combustible.

*** To be used only if segmentation or nature of process precludes potential for criticality. Otherwise, use the criticality lists for U_{233}, U_{235} and Pu_{239} of 500, 700, and 450 grams, respectively.

- Complete items 3, 4a, and 4b.
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3. Article Addressed to: Mr. Watson Gin Acting D. Dir. Hazardous waste mngmnt Dept of Toxic Substances P.O. Box 801 Sacramento, CA 95812-0806

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PS Form 3811, December 1994 102595-98-B-0229 Domestic Return Receipt

7/21/99

Mr. Watson Gin
Acting Deputy Director
Hazardous Waste Managem
Dept. of Toxic Substances C
POB 801
Sacramento, CA 95812-080

Re: EPA ID # CA 4890008986-Lawrence Berkeley National Laboratory (LBNL) Permit Modification Request re: Hazardous Waste Handling Facility (HWHF) Operations

Dear Mr. Gin,

GB-8

Per our telephone conversation of July 19, 1999 in which you agreed to forward documentation, which I would provide, to the DTSC independent group reviewing the Committee to Minimize Toxic Waste's (CMTW's) appeal of your decision on LBNL's permit modification request, enclosed find the following documents which support CMTW's position that substantial changes have occurred with respect to the circumstances under which the project was undertaken. Under CEQA guidelines such changes require a subsequent or supplemental EIR for the project.

1. Feb 20, 1996 memo to David Balgobin, LBNL, from Gerald Weinstein, M.H. Chew and Associates, indicating that only if the HWHF fence boundary is changed will exceedances (opf regulatory standards for radiation exposure) not occur at the replacement HWHF.

2. July 14, 1999 letter to Gene Bernardi, CMTW, from Terry Powell with attached Joint Memorandum, signed in concurrence April 11, 1996, extending boundary of LBNL such that exceedances of regulatory standards would no longer occur for an offsite member of the public due to the fence line being moved a considerable distance from the former fence line around the replacement HWHF.

3. Sept. 1997 Change Notice #1 of ***DOE Standard,*** *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports,* (US DOE Attachment 1, p A-12) increasing the Category 3 Non-Reactor Nuclear Facility tritium threshold value from 1000 Ci to 16,600 Ci.

The need for a permit modification to increase storage of "mixed" waste and its treatments would not exist if it were not for the tritium "mixed" waste generated by the National Tritium Labeling Facility.

The DOE is not only the enforcer of the regulations governing radionuclides at its facilities, but it conveniently changed a regulation by a magnitude of 16 in order to retroactively legitimize the construction of a non-nuclear HWHF! Furthermore, by virtue of the land (both within and outside of the LBNL) being U.C. Regents' property, the Lab has been able, outside of public knowledge, to merely move its boundaries outward in order to declare that they are not exceeding radiation dose regulations, and to declare the groundwater tritium contamination plume is within LBNL boundaries. If the Lab were surrounded by private property, public notification and ;public hearings regarding these boundary changes would be impossible to avoid.

While the DTSC claims its jurisdiction covers only the hazardous portion of mixed waste, its decision approving the permit modification allows the exposure to radiation of children at the Lawrence Hall of Science, workers (including pregnant women), students and persons visiting Strawberry Canyon for recreation.

We again ask that the DTSC take seriously its mandate to make permit decisions protective of human health and the environment.

GB-8 cont.

The actions of LBNL/DOE, to bring itself into apparent compliance, after the fact, regarding the construction of a non-nuclear HWHF facility definitely merit a subsequent or supplemental EIR as these actions are inextricably related to the permit modification under consideration.

In Health,

Gene Bernardi

Gene Bernardi, Cochair CMTW
9 Arden Road, Berkeley, CA 94704
510-843-2152

cc: Governor Gray Davis
Director Winston Hickox, CA EPA
Senator Don Perata
Assemblywoman Dion Aroner
US Congresswoman Barbara Lee
US Senator Barbara Boxer
US Senator Dianne Feinstein
Federal Facilities Coordinator Philip Armstrong, US EPA
Mayor Shirley Dean and Berkeley Councilmembers
Mayor Jerry Brown and Oakland Councilmembers

M.H. Chew & Associates, Inc.
Safety Professionals

:424 Concannon Blvd.. Livermore. CA 94550-6006
510-443-507: Fax: 510-373-0624

Memorandum

Date: February 20, 1996

Subject: Basis for Differences Between Criteria Hierarchy In the First and Subsequent Drafts of the Final Safety Analysis Document (FSAD) for the Hazardous Waste Handling Facility (HWHF).

From: Gerald Weinstein, M.H. Chew & Associates, Inc. Gerald Weinstein

To: David Balgobin, Lawrence Berkeley National Laboratory (LBNL).

cc: Carol Kielusiak, LBNL.
Robin Wendt, LBNL.
Charles Guenther, CAI.
Steve Velen, CAI.

GB-8 cont.

Per your request, I am hereby providing the basis for the change to the chemical criteria selection hierarchy used in the first draft of the FSAD for the evaluation of potential health impacts due to hypothetical accidental releases of chemicals at the replacement HWHF. The initial analysis of this facility was based upon a conservative set of screening criteria that were to be used in the absence of published values for the primary chemical accidental release criterion, the Emergency Response Program Guides Level 2 (ERPG-2). For this conservative screening analysis, the order of hierarchical substitution from highest to lowest criterion was as follows: Threshold limit values–short-term exposure levels (TLV–STEL) or TLV–ceiling (TLV–C) values, EPA Levels of Concern (LOCs), and TLV–time weighted averages (TLV–TWA). As discussed below, this original hierarchy was conservative because it did not take into account that TLV–STELs and TLV–Cs are tightly linked to and used in conjunction with TLV–TWAs. As such, the values were derived assuming an already continuous chronic exposure that will not occur for the offsite public. Thus, LOCs, which were developed strictly for accidental release exposures, should be applied, where available, in lieu of the TLV–STELs and TLV–Cs.

The purpose of a screening analysis is to analyze the potential consequences of realistic bounding chemical release scenarios. A conservative set of toxicological criteria or chemical modeling techniques were initially employed in the first stage of analysis. If no exceedances of the bounding concentrations were found using conservative screening toxicological criteria. then no further resources would be expended to re-evaluate the criteria or assumptions used in the analysis. As noted below, the initial screening analysis that was used to evaluate the replacement HWHF in the first draft of the FSAD indicated exceedances. In the reanalysis for the FSAD, given the pending relocation of the HWHF fence boundary, no exceedances occurred due to the physical distance between the hypothetical accidental sources and the location of the nearest hypothetical offsite member of the public.

Subsequent to completion of the first draft of the FSAD, we were independently contracted to evaluate, using similar methodology, the potential offsite exposures due to accidents at the existing HWHF. Our initial analysis indicated there would be exceedances at the existing facility under the assumptions and methodology used in the screening analysis of the

11844

replacement facility. Therefore, following the general approach to screening analyses, the basic assumptions of the analysis for the replacement facility were re-evaluated to determine whether any changes were warranted in order to reach a more realistic conclusion as to the potential risk of public exposure at the existing facility. It should be noted that a re-evaluation of the replacement HWHF was already being conducted independent of the analysis of the existing facility because, as noted above, using initial information on the site boundary, exceedances were indicated at the replacement facility. The re-evaluation of the replacement HWHF had stopped once it was discovered that no exceedances would occur at the replacement facility if the move of the fence boundary (that LBNL facilities engineering was planning for the purposes of land management) were taken into account.

Among the assumptions we scrutinized during the re-evaluation of the existing HWHF was the hierarchy placing TLV–STELs and TLV–Cs above LOCs. The American Conference of Governmental Industrial Hygienists (ACGIH, 1995) defines TLV–STELs and TLV–Cs as follows:

> Threshold Limit Value–Short-Term Exposure Limit (TLV–STEL)—The concentration to which workers can be exposed continuously for a short period of time without suffering from: (1) irritation, (2) chronic or irreversible tissue damage, or (3) narcosis of sufficient degree to increase the likelihood of accidental injury, impair self-rescue, or materially impair work efficiency, and provided that the daily TLV–TWA is not exceeded. It is not a separate independent exposure limit; rather it supplements the time–weighted average (TWA) limit where there are recognized acute effects from a substance whose toxic effects are primarily of a chronic nature. STELs are recommended only where toxic effects have been reported from high short-term exposures in either humans or animals.
>
> A STEL is defined as a 15-minute TWA exposure, which could not be exceeded at any time during a workday even if the 8-hour TWA is within the TLV–TWA. Exposures above the TLV–TWA up to the STEL should not be longer than 15 minutes and should not occur more than four times per day.
>
> Threshold Limit Value–Ceiling (TLV–C): the concentration should not be exceeded during any part of the working exposure.

GB-8 cont.

EPA (1987) defines LOCs as follows:

> Levels of concern (LOCs), for the purpose of this document, are defined as the concentrations of an extremely hazardous substance in air above which there may be serious irreversible health effects or death as a result of a single exposure for a relatively short period of time.

In reviewing the above criteria, it became clear that TLV–STELs and TLV–Cs are designed to cover work exposures that could occur repeatedly over an entire working lifetime, unlike an accident situation in which the members of the exposed public would not have had any significant prior exposure. The TLV–STELs and TLV–Cs presuppose an already continuous exposure to chemical substances for up to an entire working lifetime. On the other hand, LOCs are developed for the instances in which the public could be exposed to chemical substances for a short time period due to a rare accident and subsequently receive no prolonged additional exposure. In the instance of the current analysis, the concentrations modeled due to accidents represent peak concentrations (i.e., represent maximum short-term concentrations without considering the depletion of the amount of chemicals over time at the source).

The US EPA (1987) has developed guidance for evaluation of such accidental releases. In the guidance document, EPA derived and recommended the primary use of LOCs (see Appendix C and Table C–2 of the document in particular) for chemicals without published ERPG–2 values. Such LOCs were derived by dividing the immediately dangerous to life and health (IDLH) values by a factor of 10 (EPA, 1987). Only in those instances where no ERPG-2s or IDLHs existed for chemicals being analyzed would the TLV–STELs, TLV–Cs, or TLV–TWAs be considered. In light of the fact that such events should be rare and the fact that no such accidents have occurred during the entire lifetime of the existing facility, we determined that LOCs represented the most appropriate criteria among those considered in the absence of ERPG-2s for evaluating the consequences of such a hypothetical release at the existing and the replacement HWHFs. Consequently, following the approach employed by EPA (1987) to assign criteria for accident analysis, the hierarchy was revised so that LOCs took precedence over TLV–STELs and TLV–Cs both for the analysis of the existing facility you asked us to do and the FSAD DOE is requiring for the replacement facility. **GB-8 cont.**

References:

ACGIH 1995, American Conference of Governmental Industrial Hygienists, 1995-1996 "Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)," Cincinnati, Ohio.

EPA 1987, U.S. Environmental Protection Agency, Federal Emergency Management Agency, and U.S. Department of Transportation, "Technical Guidance for Hazards Analysis, Emergency Planning for Extremely Hazardous Substances," Washington, DC.

BERKELEY LAB

July 14, 1999

Ms. Gene Bernardi, Co-Chair
Committee to Minimize Toxic Waste
9 Arden Road
Berkeley, CA 94704

GB-8 cont.

Dear Ms. Bernardi:

In response to you request for the date on which Lawrence Berkeley National Laboratory's boundary was extended, please see the attached Joint Memorandum issued on March 28, 1996, and signed in concurrence on April 11, 1996, by the University of California at Berkeley and Ernest Orlando Lawrence Berkeley National Laboratory.

Sincerely,

Terry Powell

Terry Powell
Community Relations Coordinator

Enclosures

attachment 2

March 28, 1996

Joint Memorandum

To: Horace Mitchell, Vice Chancellor for Business and Administrative Services
University of California at Berkeley

Klaus Berkner, Deputy Director for Operations
Ernest Orlando Lawrence Berkeley National Laboratory

From: Leroy Bean, Associate Vice Chancellor of Business and Administrative Services
University of California at Berkeley

Robert Camper, Facilities Manager
Ernest Orlando Lawrence Berkeley National Laboratory

Subject: Management of Hill Area Lands

GB-8 cont.

As was stated in the Letter of Cooperation between Chancellor Tien and Director Shank, the University of California, Berkeley (Campus) and the Ernest Orlando Lawrence Berkeley National Laboratory (Berkeley Lab) share a common interest in cooperating to manage the risk of wild land fire and to ensure safe and orderly use of Regents property in the east bay hills. To further these objectives, Chancellor Tien and Director Shank have requested that the staff of each organization work closely to support common concerns and interests and have agreed that Berkeley Lab assume management responsibility for particular lands. This memorandum affirms our intent to cooperate and outlines specific implementation guidance relating to the transition of management responsibilities for the specific lands. We ask for your concurrence on this implementation guidance.

A fence and/or other markers, will be installed by Berkeley Lab to clearly delimit boundaries of the management area illustrated (with a crosshatch pattern) on the map attached to the Letter of Cooperation. A licensed surveyor/engineer will survey and document the Regents property line between Cyclotron Road and Campus Drive in 1997. Cost of this survey will be shared equally by the Campus and Berkeley Lab. Following this survey, the Lab and the Campus will work with the President's Office to resolve any disputes with owners of adjacent property regarding ownership rights prior to placement of a fence in the area by Berkeley Lab in 1998/9. To ensure free access from campus to the Big "C", no fence will be installed in the Big "C" draw.

Berkeley Lab will manage the area consistent with the Campus Long Range Development Plan (LRDP). When the Berkeley Lab completes an updated LRDP, this area will be addressed in the preparation of the Berkeley Lab LRDP. After adoption of the revised Berkeley Lab LRDP by the Regents, the Berkeley Lab LRDP shall be the guiding document. Berkeley Lab commits to manage the area such as to ensure that:

Access to natural areas is assured to Campus researchers as needed. Access will be accommodated consistent with Berkeley Lab site access and maintenance policies.

Management of the Chicken Creek riparian area will be accomplished in a manner which recognizes the fragile nature of this environment.

Erosion and sedimentation controls will be guided by best management practices including those described in the Bay Area Association of Governments "Manual of Standards for Erosion and Sediment Control Measures" (May 1995). Techniques which minimize erosion shall be preferred to those which reduce siltation where the former are practical. Use of mulching and vegetative soil stabilization (Chapter 8), soil stabilization fabrics (Chapt. 7 Measure D) and similar measures will be given preference.

Sustainable landscape management treatments will be guided by watershed biodiversity principles and be generally consistent with the East Bay Hills Vegetation Management Consortium's "Fire Hazard Mitigation Program and Fuel Management Plan for the East Bay Hills " (May 1995)

In addition, Berkeley Lab and the Campus will work to achieve the following objectives and activities:

In order to allow for fuel management as well as the visual and functional integration of lands into Berkeley Lab, Campus will relocate materials from the Poultry Husbandry/Chicken Creek area to be managed by Berkeley Lab prior to September 1996. Berkeley Lab may demolish the wooden shed located immediately below Building 31.

Access to Campus-maintained hydraugers and fire trails is assured to Campus facilities staff. Maintenance of utilities and roads will be unchanged with the exception of those portions of fire roads which will be located within Berkeley Lab, which will now be maintained by Berkeley Lab. It is acknowledged that Berkeley Lab and its vegetation management contractors may use the Upper Jordan Fire trail to access the area above Building 74 and to remove debris and plant material from this portion of the site.

Campus staff and contractors shall continue to have access to lands adjacent to Centennial Drive and all other Campus-managed roads outside of Berkeley Lab in order to repair drainage, roadbed, soils or bedrock conditions which make the roadway less safe or usable.

Should historic contaminated soil or ground water be identified in the management area, remediation will remain the responsibility of its source.

GB-8 cont.

Berkeley Lab will continue to explore options which may allow it to bring two small contiguous parcels of Campus-managed Regents property, at the western base of Blackberry Canyon and immediately north of lower Cyclotron Road, under its management. During this time, Campus will develop an access system in these areas.

Berkeley Lab and the Campus will update the Campus Hill Area Fire Prevention Committee annually on the progress in wildland fuel management made under this joint memorandum.

We look forward to working with you to implement the Letter of Cooperation. In the event a dispute or disagreement should arise, it is our intent that it be amicably resolved by the staff with our guidance. We will, of course, inform you if any dispute or disagreement should one arise.

We appreciate the opportunity to work together in order to reduce the risk of wild land fire and to ensure safe and orderly use of Regent property in the east bay hills.

Respectfully submitted,

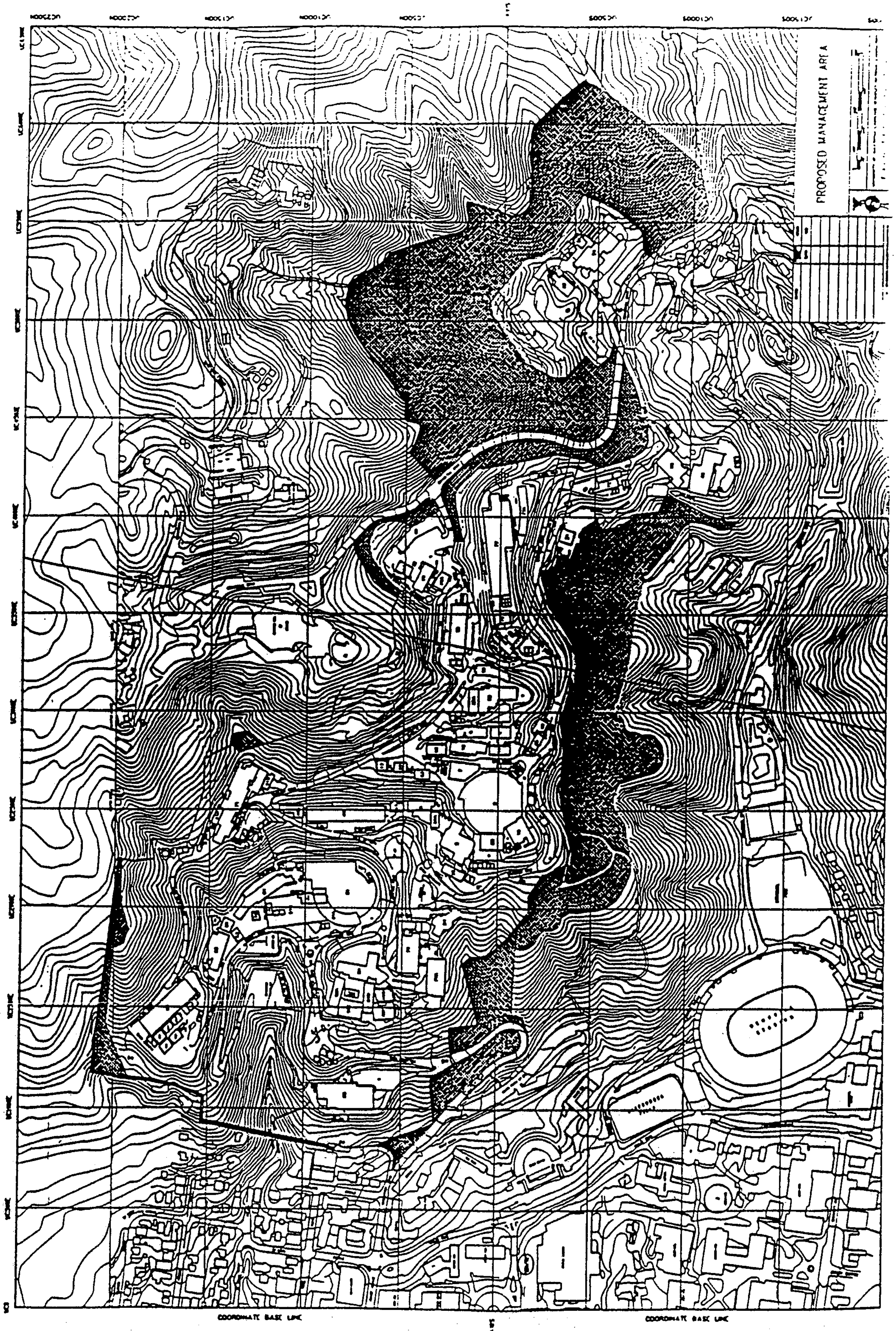
Leroy Bean	J. Robert Camper
Leroy Bean Assoc. Vice Chancellor of Business and Administrative Services UC Berkeley	J. Robert Camper Facilities Manager Berkleley Lab
3/28/96 Date	3-28-96 Date

Signed in Concurrence:

Horace Mitchell	K Berkner
Horace Mitchell Vice Chancellor for Business and Administrative Services UC Berkeley	Klaus Berkner Deputy Director for Operations Berkeley Lab
4/2/96 Date	4-11-96 Date

GB-8 cont.

cc: Chancellor Tien
Director Shank
Senior Vice President Kennedy
Site Office Manager Nolan
Director Dobbins


PROPOSED MANAGEMENT AREA
COORDINATE BASE LINE
COORDINATE BASE LINE

GB-8 cont.

March 15, 2010

Jeff Philliber, UC-LBNL Environmental Planner
Lawrence Berkeley National Laboratory (LBNL)
One Cyclotron Road, MS 76-234A
Berkeley, CA 94720

cc: Kim Abbott, Environmental Program Manager
Office of Science
Berkeley Site Office
1 Cyclotron Road MS 90-1023

re: Draft Environmental Impact Report for Seismic Life Safety, Modernization, and replacement of General Purpose Buidlings, Phase 2 Project, SCH# 2008122030 GC-1

Dear Mr. Philliber and Ms. Abbott:

This is written in response to the invitation for public written commentary regarding the subject project, as required by the California Environmental Quality Act (CEQA) for a draft Environmental Impact Report (DEIR) and for all requirements of the National Environmental Protection Act (NEPA).

We hereby advise you of the hazards of the construction on the LBNL (Lab) site, as presently proposed in the subject DEIR. We also wish to emphasize the dangers to people, structures and vulnerable research facilites that may in any way contain hazardous materials, should this project be executed at the proposed LBNL site.

Regarding the geology of the site the observations cited in the DEIR concerning the adequacy for construction are seriously deficient. Lacking are geological studies for the General Purpose Laboratory (GPL) deep enough to provide any understanding of the geology below approximately three meters. GC-2 Furthermore the severe destruction to the Lab infrastructure is predictable due to the mercurial geology and steepness of the Lab site. GC-3

Of primary concern should be the fact that an earthquake is now predicted to be imminent on the Hayward Fault trace. That trace runs completely through the lower west side of the Lab site. When the event occurs, it is predicted to destabilize the entire Lab site. CEQA establishes significant relevant criteria for impacts. It asks if the impact of the proposed project related to geology and soils would be considered significant. GC-4 Certainly it would expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

Curtiseral 1

a) rupture of a known earthquake fault
b) strong seismic shaking
c) seismic-related ground failure, including liquefaction
d) landslides

GC-4

The attachments will describe the underlying geology of the LBNL site which should convince you that:

1. No new buildings of any kind should be construsted on the present LBNL site.

2. A plan to relocate all the existing facilities to a safer location, preferably well west of the known Hayward Fault trace should be instituted

3. The available UC Richmond Field Station site should be seriously considered.

GC-5

Very truly yours,

Garniss Curtis

Garniss Curtis, PhD, Professor Emeritus, Earth and Planetary Sciences, UCB
10 St. James Court
Orinda, CA 94563

Georgia Wright

Georgia Wright, PhD,
105 Vicente Road
Berkeley, CA 94705

John R. Shively

John R. Shively, P.E.,
2 Van Cleave Way
Oakland, CA 94619

Attachments::
Transcript of Video with John Shively and Garniss Curtis
Map of LBNL and Caldera
Section of Caldera
Garniss Curtis
4 reports from B. J.Lennert (1979-1987)
Questions from the Appendices

Curtis et al 2

Transcript of Video "The Fault: Quakes, Slides, & the Lawrence Berkeley Lab"

I'm Ignacio Chapela, Professor of Environmental Sciences at UCBerkeley. I'm on the board of Save Strawberry Canyon and we've made a video for the university community, the neighbors of Strawberry and Blackberry canyons, and the citizens of the Bay Area. This concerns the danger from the buildings already on the hillside and from those planned for it.

I am standing on the lower fire trail, south of Centennial Drive. Behind me the black box you see is the new Molecular Foundry, 96,000 square feet. GC-6
UC and the National Lab want to construct 980,000 new square feet of buildings while demolishing 320,000, thus adding 660,000 square feet to the lab campus. They want 500 new parking places and 860 new employees.

All of this is planned for Blackberry Canyon, directly above Hearst Avenue and its houses and dorms, and in Strawberry Canyon, north and south of Centennial Drive, above the stadium, Greek Theater and dorms.
This is extremely unstable land, and close to the Hayward Fault. This video will explain our concerns.

I'm John Shively.In the early 70's I was the Principal Engineer at UC Berkeley Office of Architects and Engineers.

In August of 1974, during a major drought, I received a call from Lawrence Berkeley Lab advising that the steep hillsides were sliding in two separate areas near the Lawrence Hall of Science, due to underground water. I called consulting civil engineer, Ben Lennert, and we drove up to observe the slides.

The most active slide was on the steep hillside below Lawrence Hall of Science and above the Lab Hilac accelerator building. It had broken a lab building, broken an internal lab road, and cut the underground utilities . This slide was growing rapidly and threatened the Lawrence Hall of Science. GC-7

The other slide was located on the steep hillside above the Lab corporation yard and just below the steep portion of Centennial Drive. It was slower moving but had severed the underground utilities that served the Hall of Science and threatened to take out Centennial Drive above the corporation yard.

Ben's first idea was to drill hydraugers, which are horizontal wells, into the corporation yard hillside, hoping to tap the aquifer and let gravity drain the water. He drilled several hydraugers but failed to hit the aquifer. I then surmised that that much water had to be coming from the much larger watershed located higher up in the expansive Grizzly Peak area of Tilden Park. I proposed drilling a conventional vertical well just at the south end of the Space Science Lab. We drilled the well and hit the aquifer at about 150 feet down.

Centrieral 3

Video 2

When we commenced pumping, both slides stopped. We directed the water south into Strawberry Creek. Some of it was intercepted for very welcome use in the drought-parched UC Botanical Gardens. GC-7 cont.

I'm Garniss Curtis, emeritus professor in the department of Earth and Planetary Sciences at the University of California, Berkeley. Ina Letter I wrote to the regents, I emphasized that there should be no buildings in Strawberry Canyon near the Stadium nor Blackberry Canyon and these are the reasons why.

In working with Ben Lennert 25 or 30 years ago investigating landslides and also places that new buildings could be made, I found geologic reasons that threaten these areas. The geologic setting is this. Here is the active Hayward Fault. Here is the Wildcat Canyon Fault and between them once 10 million years ago was a volcano. That volcano erupted violently and made a big cavity in which this whole area collapsed to form a great void.

The outlines of the western margin of that void is here from the botanical garden going northwards several miles and includes all of these buildings resting on material that collapsed into the void we call a caldera.

In working with John Shively and Ben Lennert concerning the slides on Centennial and this location which threatened these buildings to the west, we found we were in volcanic rock fragments, volcanic rock, in clay matrix which was sliding as water moved it.

In this caldera filled with debris from the old cone, it left great cavities between large blocks of andecite which collected water and that water was gradually seeping out and causing these landslides, and unless they pumped that water out some way, we'd continue to have slides in this caldera material. GC-8

A horizontal hole drilled did not relieve the water, but when a vertical hole was put down, it bumped into one of these cavities filled with water and over the next 10 years 16 or 14 million gallons of water were pumped out. That's a huge amount of water to pump out of one place, but that was a function of the collapsed material making many cavities that were not filled with ash and left vacancies for water.

The Hayward Fault, after passing close to Bowles Hall, goes right through the stadium where it has offset the two sides of the stadium since its construction in 1923. The interior pillars damaged some 30 years ago have only recently been reinforced with concrete and reinforcing steel.

Behind Hearst Mining Bldg and a few feet to the east if the Lawson Adit, , that is a tunnel going eastward to the Hayward Fault. In the tunnel are several exposures of the offset of Strawberry Creek as determined from the contained rounded cobbles of Strawberry Canyon origins. This indicates a displacement of more than 2000 feet north along the Hayward Fault. East of the Hayward Fault are cretaceous sedimentary rocks older than 65 million years. These are dipping westward at 20 to 30 degrees.

(Above Stern Hall)What we're looking at here is sandstone, bedded sandstone, and you can see the parting dipping off toward the Bay and two parting zones dipping off toward the Bay on the outcrop of the sandstone and disappears up hill there and disappears under the soil.

(drawing) This caldera is like a great big tub of mud with no rigidity to it at all and much heavier than water, pressing against these cretaceous beds dipping westward.

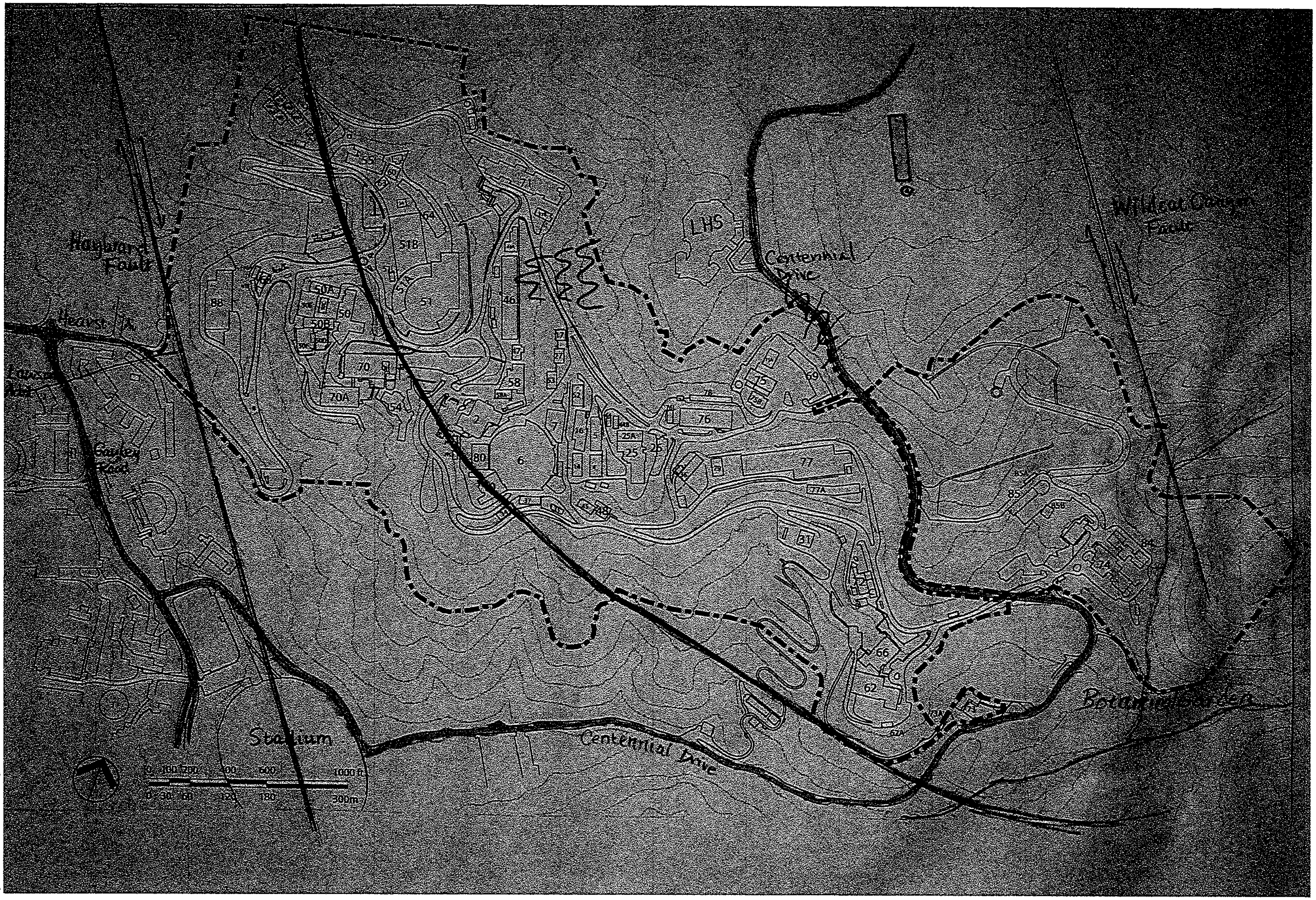
The US Geological Survey has made extensive study of the Hayward Fault and found that the return time on earthquakes going back to the time of Christ is about 130 years. The last major quake was in 1868, 140 years ago. In short it's overdue. The survey by USGS says that there's a 65% chance of a major quake, 6.5 to 7 magnitude, occurring in the next 35 years. If an earthquake occurs when these beds have been soaked with winter rain, the chances of a major landslide are great along the slippage planes of sandstone dipping westward towards campus. Buildings in the lower parts of both Strawberry and B Canyons would be buried if not destroyed. These buildings will move Keep in mind the Loma Prieta quake of 1989 of magnitude 6.9 which from a distance of over 60 miles destroyed a section of the Bay Bridge, a section of the overhead freeway in Oakland. killing 63 people, and many houses on filled ground in the Marina of northern San Francisco some 70 miles from the quake! GC-8

No major buildings should be built on the hills or canyons above the campus.

(Ignacio)There are alternatives to constructing more buildings above campus. These alternatives are cheaper and certainly much safer and many are owned by the university.

I hope that the Regents and administrators of the university will consider the dangers to students, faculty and neighbors of building on these fragile hill sites so close to the Hayward Fault. GC-9

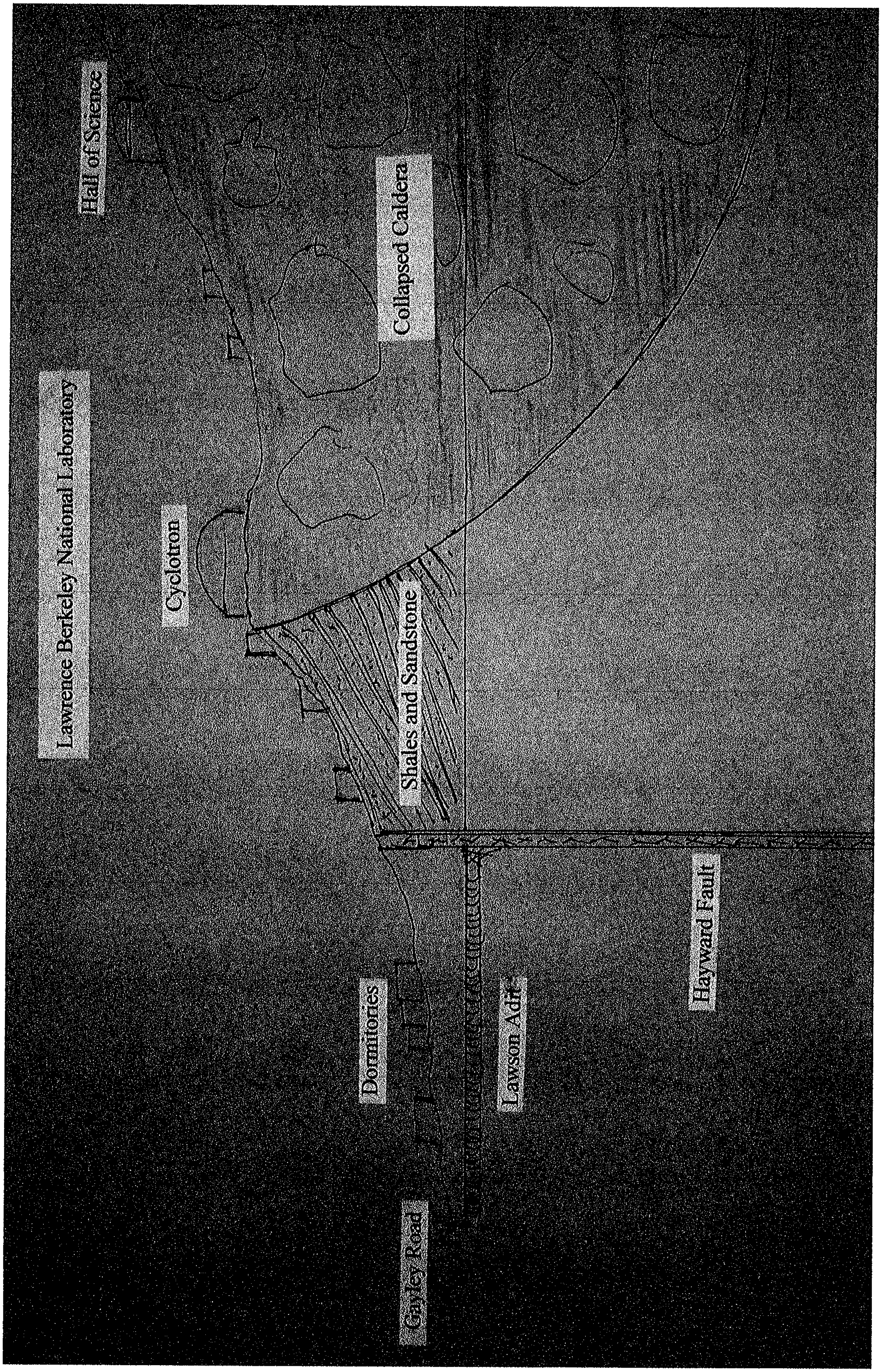
This video is being distributed in order to alert those at risk as well as those with the responsibility for the safety of the campus and its neighbors.



LBNL with extent of caldera

Cutis eral 6

GC-10



GC-11

Cunieral 7

The soil profiles obtained by Lettis from shallow trenches around Building 25 revealed expansive soils that soak up water during wet seasons and would be subject to sliding during a major earthquake. (Lettis, Appendix Plates 2 & 3 attached here) The trenches also revealed isolated blocks of andesite (volcanic stone) 10 and more feet in length and 4 feet in diameter.

Elsewhere in the Berkeley area are large pieces of andesite 10 feet in width and 30 feet in thickness. These are all randomly oriented. All of these are in a matrix of clay-rich sedments, sometimes horizontally bedded, often, though, in contorted beds, and some piled on top of each other. For example, in a small quarry a few hundred feet north of GC-12 LaLoma Avenue, these blocks show deformation from the differential pressure they were under from deep burial. The Orinda Formation is named for outcrops near Orinda, beautifully exposed on the east side of Caldecott Tunnel. The consultants' reports label almost any sandy and pebbly beds as Orinda Formation. There is no Orinda Formation in the caldera. The formation is older than the volcano.

Lettis and Associates separate some units and identify formations which, on Grizzly Peak Boulevard may easily be identified as the Orinda and Moraga Formations. Lettis and Associates, however, identify any sandy beds exposed at the surface or in bore holes as Moraga Formation. This sandy material is missing, however, in the Moraga Formation found along the road to Redwood Canyon. The Moraga thrust fault at the base of the Moraga andesite flows is well exposed there.

None of the reports done for this EIR contain a reputable geologic map of the LBNL GC-13 area. More investigation of areas outside the Lab site might have alerted the consultants that the LBNL area is geologically different from any other area in the Berkeley Hills. It is bounded on the east by the Wildcat Fault and on the west by an arcuate contact between Upper Cretaceous Great Valley Sequence, well bedded shales and thin sandstone beds, all of which dip westward at about thirty degrees. (See Transcript and its figures) The boundary has been named the "Chicken Creek Fault"; it is probably not a fault as it approximately makes an arc starting at the Wildcat Fault immediately south of the Botanical Gardens and swinging around to meet the Wildcat Fault crossing Shasta Road not far uphill from the Brzilian Room. We identify this contact as the margin of a caldera which collapsed after a large eruption evacuated the magma chamber under the volcano. GC-14 In fact we think we have identified a large welded ash flow that poured out of this magma champber to the west of the Hayward Fault. It has the same age (10 million years) and mineral composition as a rhyolite tuff exposed in the center of Moraga volcanics along Grizzly Peak Boulevard and at the southern end of the Moraga Formation at the type locality.

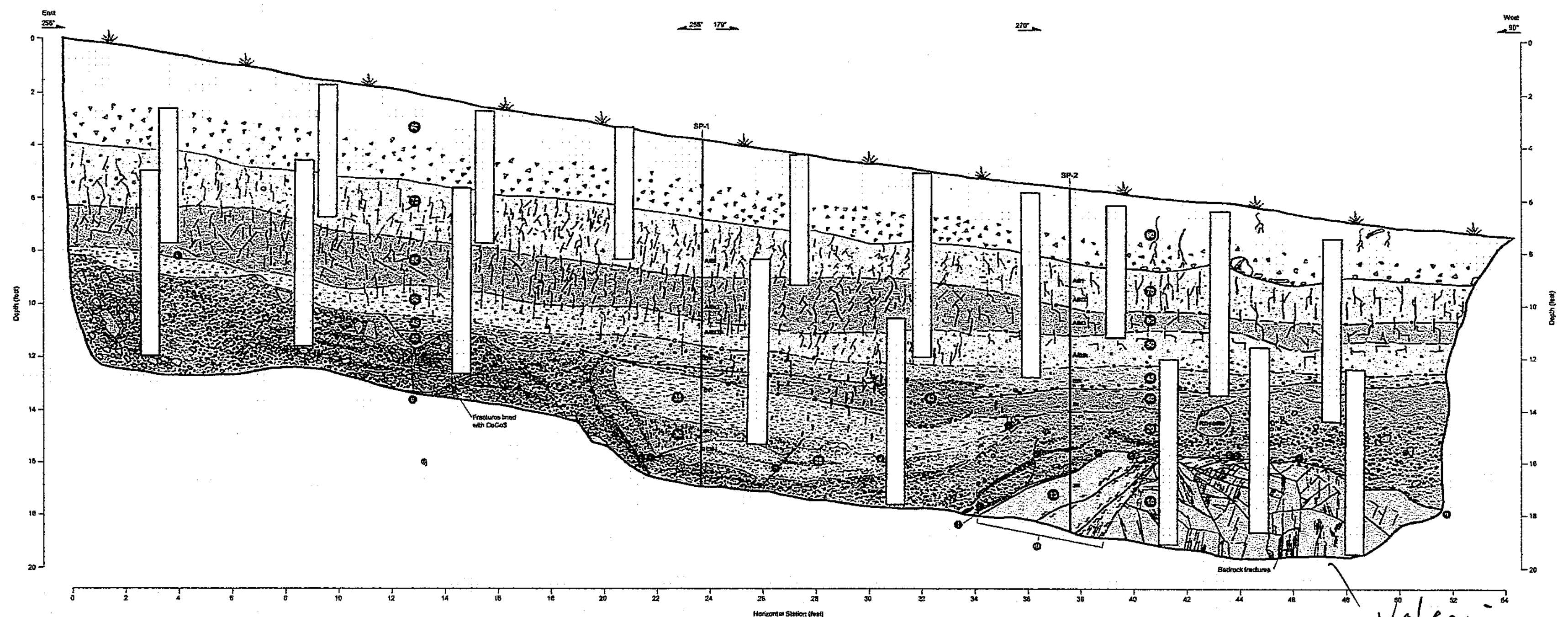
The collapsed volcanic rocks that fell and slid into the caldera were subsequently buried by sediments and volcanic ash. Many voids between the piles of blocks and andesite collected ground water, recently tapped by wells drilled by Lennert and Shively. Lennert told me that over a period of ten years, 14 to 16 million gallons of water were pumped out. (See Lennert Letter of 1987).

The US Geological Survey predicts a major earthquake of magnitude 6.7 or greater will occur on the northern section of the Hayward Fault with a 62% probability before 2032. The great earthquake of 1868 broke along the southern part and extended almost to the campus of UC. The Hayward Fault runs along the west margin of LBNL so that there will be severe ground-shaking in this area. Consider the damage caused to the Bay Bridge and Cyprus Ramp from the Loma Prieto quake in 1989, whose epicenter was 50 miles away. Should the northern Hayward Fault undergo a comparably large failure with an epicenter, say, 7 miles from LBNL, the force would be 50 times that which struck the Bridge and Ramp in 1989. GC-14 cont.

The sediments collected in the caldera are not suitable material upon which to build. A major eaarthquake during a wet period could lead to landslides in caldera soft sedimentary rocks and the collapse of the west wall of the caldera with its stratified creetaceous shales dipping westwared toward dormitories and houses. Measurements show that the Hayward Fault is creeping right laterally about 0.5 cm per year while the east side of the fault is rising 0.5 cm per year, becoming more unstable. Sooner of later this cretacous wall will slide, taking with it most of LBNL. The imminent earthquake of the Northern Hayward Fault might trigger it.

Fugro WLA
Project No. 2072.001 LBNL Building 25

William Lettis & Associates, Inc.



Volcanic

Explanation

Symbols

- Soil pattern
- Pedogenic fractures
- Contact, solid where certain, dashed where approximate, dotted where inferred
- Fault, dashed where approximate, queried where uncertain
- Shear fabric
- SP-1 Soil profile (see Appendix A): A, A/B1, A/Bt2

Unit Descriptions

Upper fill: SILT (ML); Very dark gray (10YR 3/1); dry; stiff; 85% silt, 10% very fine sand, 5% clay; High dry strength; high toughness; no dilatancy; low plasticity; block massive structure, abundant roots (1" to 0.5" diameter) and rootlets, common large roots (>1" diameter), basal contact planar to slightly undulatory over 2-3".
Lower fill: Sand with silt and gravel (SW); Light yellowish brown (2.5Y 6/3); dry; dense; 90-95% matrix (matrix: 80% very fine sand, 20% silt), 5-10% gravel; low dry strength; slow to no dilatancy; low toughness; non-plastic; gravel is angular 1" to 3" clasts, gravel clasts are sandstone and are parent material for matrix, rare glass along basal contact, basal contact is planar and sharp [FILL].

CLAY, silty with sand (CL); Very dark gray (10YR 3/1); dry to slightly damp; stiff; 70-80% clay, 20% silt, <10% fine sand, trace coarse sand; medium dry strength; slow dilatancy; medium to high toughness; medium to high plasticity; angular block to weak columnar pedogenic structure, strong brown (7.5YR 4/6) mottles coating vertical columnar pedogenic surfaces, moderate to weak clay films coating some coarse sand clasts, common fine pores, common roots and rootlets; weak to no reaction to HCl; massive, angular coarse sand consists primarily of Moraga Formation fragments; slightly wavy diffuse basal contact over ~6" [COLLUVIUM, A and A/Bt pedogenic soil horizon].

CLAY, silty (CL), trace coarse sand; Very dark gray (10YR 3/1); slightly damp; medium stiff; 70-80% clay, 20-30% silty, trace to ≤ 5% coarse sand; low to medium dry strength; no dilatancy; low toughness; medium to high plasticity; angular irregular to massive pedogenic structure; moderate to weak clay films on pedogenic faces and coating coarse sand clasts, weak carbonate (CaCO3) film coating clasts, clasts are weakly effervescent, matrix (clay) does not effervesce with HCl, common roots and rootlets, few fine pores; trace sands are angular and consist of Moraga Formation, coarse sand clasts seem to be associated with areas with higher abundance of roots, lining root casts, diffuse basal contact over ~5", wavy [COLLUVIUM and mixed siltstone bedrock with A/Bt2 soil overprint].

Unit Descriptions (continued)

CLAY, silty with sand (CL-ML), Dark reddish brown (5YR 3/3); dry to slightly damp; medium stiff; 60% clay, 25% silt, 15% fine- to coarse-grained sand; sand is 10% coarse, 5% fine-grained, subrounded to subangular sand of Moraga Formation (Rhyolite and Andesite) and clasts of mixed alluvial bedrock deposited at post/coincident Moraga time (siltstone clasts); medium dry strength; no dilatancy; medium toughness; medium plasticity; irregular angular to very weak blocky pedogenic structure; weak clay films coating clasts; CaCO3 coating clasts, abundant small ~ 1-2 mm rounded carbonate nodules throughout; basal contact is gradational over <4 inches, [BEDROCK, siltstone member of the mixed alluvial bedrock deposited at post/coincident Moraga time, A/Bt3 with minor Btk soil overprint].

CLAY, silty (CL-ML), Dark reddish brown (5YR 3/3); dry; medium stiff; 50-60% clay, 30-40% silt, <10% sand; medium dry strength; no to slow dilatancy; medium toughness; medium plasticity; irregular angular pedogenic structure; clay films on pedogenic surfaces, abundant CaCO3 nodules 1-2.5 cm diameter along the base of the unit, some sub-vertical carbonate stringers, nodules and matrix strongly effervesce; massive; basal contact is gradational over 1-3" [BEDROCK, siltstone member of the mixed alluvial bedrock deposited at post/coincident Moraga time, Btk soil overprint].

CLAY, silty, with gravel clay, Dark reddish brown (5YR 3/3); dry; medium stiff; 30-40% clay, ~20% coarse sand, ~20% fine gravel, 10-20% silt; weakly interbedded channel within Units 40 and 45, poorly defined coarse-grained channel, granular nature of deposit, interbeds within Units 40 and 45, loose CaCO3 precipitations [BEDROCK, interbedded coarse-grained facies of siltstone member of the mixed alluvial bedrock deposited at post/coincident Moraga time, Btk soil overprint].

CLAY, silty (CL-ML), Reddish brown (5YR 4/4); dry to damp; medium stiff; 45-55% clay, 45-55% silt, <10% sand; medium dry strength; no to slow dilatancy; medium toughness; medium plasticity; weak irregular angular pedogenic structure; clay films on pedogenic surfaces and clasts, few 0.5 cm wide CaCO3 nodules, common vertical CaCO3 filaments; few angular coarse sand clasts, nodules effervesce strongly with HCl, matrix has weak to no reaction to HCl; basal contact is diffuse over <5 inches and planar [BEDROCK, siltstone member of the mixed alluvial bedrock deposited at post/coincident Moraga time, Btk soil overprint, pedogenic subunit of Unit 45].

Unit Descriptions (continued)

SILT with sand (ML); Reddish brown (2.5YR 4/4); dry to slightly damp; soft; ~60% silt, ~40% sand, trace clay; no dry strength; slow dilatancy; low toughness; low plasticity; very weak angular blocky pedogenic structure, weak clay films on pedogenic fracture surfaces and clasts; sand is fine to coarse grained, subangular; CaCO3 filaments coating/infilling some pedogenic fractures, filaments have strong reaction to HCl, matrix has weak to no reaction to HCl; Unit 35 has no residual bedrock fabric, Unit 30 has blocky siltstone fabric, siltstone is well cemented and crumbles in angular irregular <1 inch siltstone clasts [BEDROCK, siltstone member of the mixed alluvial bedrock deposited at post/coincident Moraga time, Bt soil overprint].

SAND, silty, clayey (SC-SM); Dark reddish gray (5YR 4/2); damp soft to medium stiff; ~80% very fine sand, ~10% silt, ~10% clay, trace gravel; massive with occasional gravel interbeds; well sorted; slight to strong reaction to HCl; basal contact is gradational over 1" [BEDROCK, fine-grained facies of conglomerate member of the mixed alluvial bedrock deposited at post/coincident Moraga time; Bt overprint].

GRAVEL with silt and sand (GW-GM); Reddish brown (2.5YR 4/4); dry; loose; ~55% gravel, ~35% sand, ~10% silt; conglomerate with subrounded Orinda and Moraga gravels; poorly sorted; highly friable; many CaCO3 nodules and filaments (stringers) up to 3" long; indistinguishable pedogenic structure, upper 2 feet of conglomerate is highly weathered, clasts of Orinda Formation are weathering in place; conglomerate is well cemented in places and weakly weathered where more than 2 feet of the conglomerate profile is exposed [BEDROCK, conglomerate member of the mixed alluvial bedrock deposited at post/coincident Moraga time; Bt overprint].

BRECCIATED ANDESITE; crushed and brecciated andesite with anastomosing calcium carbonate seams and coated blocks. Fault zone material.

ANDESITE; gray agglomerate volcanic rock, angular blocks of weathered andesite

Notes

- Fault orientation, 33°, 21°NW
- Fault orientation, 321°, 8°NE
- Fault plane, opposite (north) wall, 287°, 30°N
- Fault orientation, 314°, 30°N. Locally, between Stations 38 and 41 the fault plane is wavy and undulates with 3-6 inches relief. A 1-2 mm thick rind of CaCO3 coats the fault plane, the CaCO3 is moderately hard, and picks clean as resistant shell, no striations or movement indicators.
- Fault orientation, 302°, 28°NE. A 1-2 mm thick rind of CaCO3 coats the fault plane, the CaCO3 is moderately hard, and picks clean as resistant shell, no striations or movement indicators.
- Bedding orientation, 283°, 25°N
- Fault orientation, 290°, 35°NE
- Bedding orientation, 354°, 19°E
- East-dipping shear places coarse sand in fault contact with siltstone
- East-dipping shear not present on North wall, east-dipping shear is discontinuous near the base of the trench where it is truncated by a west-dipping shear. West-dipping shear is the dominant feature.
- Fault orientation, 326°, 56°SW. Across trench strike and dip measured from the base of fine sand overlying gravel.
- Soil bedding orientation, 324°, ≤10°SW (Soil ABt3)
- Clay gouge ~1.5" thick at bottom of trench thins to single strand of clay, ≤1 inch thick, where it crosses Station 38.
- Primary fault zone highly sheared, completely sheared bedrock, very weak, no remaining bedrock fabric.
- Shear zone several inches wide defined by thin seams of clay gouge CaCO3-lined shears, fractures and aligned and stretched weathered Tm pebbles.
- CaCO3-lined fractures predominantly subhorizontal through gravel to sub vertical, thick vertically orientated CaCO3-lined fracture near Station 13.

PALEOLANDSLIDE INVESTIGATION
LOG OF TRENCH T-1

PLATE 2

Appendix C-2,A Lettis Plate 2

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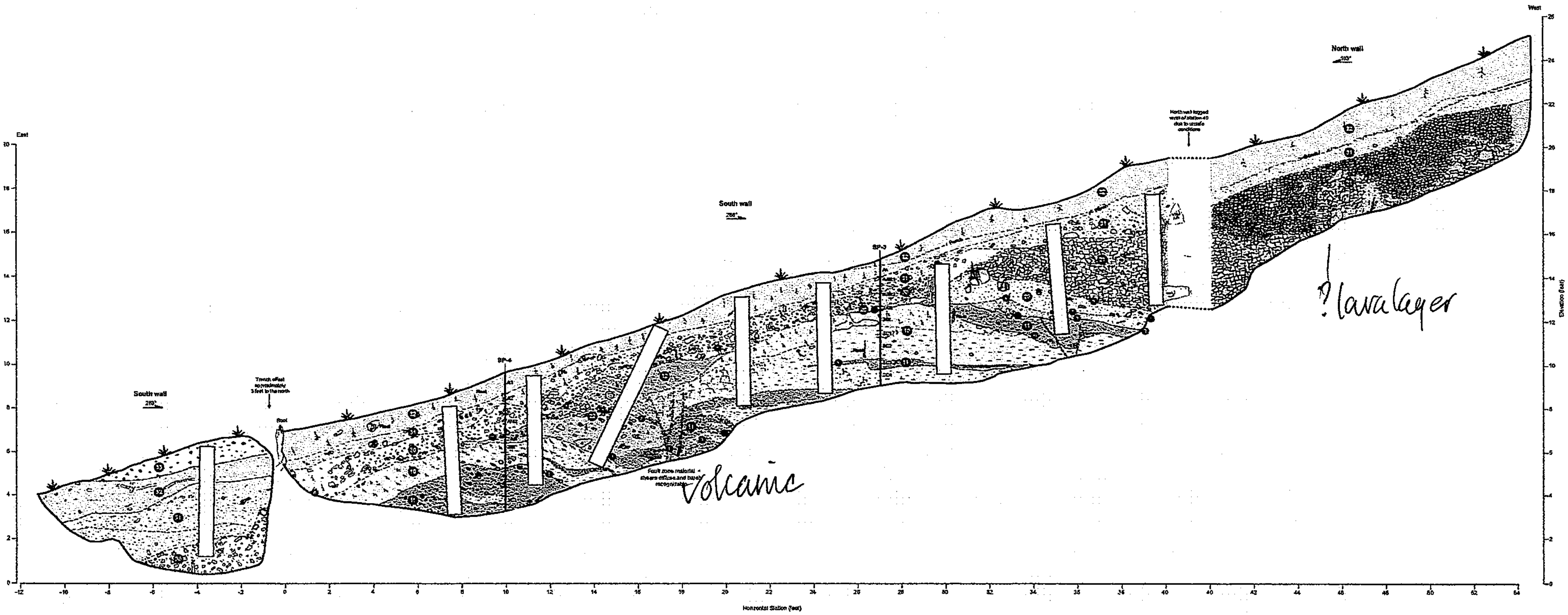
Curtis-4



Explanation

Symbols

Soil pattern

Pedogenic fractures

Contact, solid where certain, dashed where approximate, dotted where inferred

Fault, dashed where approximate, queried where uncertain, dotted where concealed

SP-4 Soil profile (see Appendix A)
A1
A2
AB

Unit Descriptions

SILT with sand and gravel (ML); very dark grayish brown (10YR 3/2); dry; medium stiff to soft; ~55% silt, ~25% sand, ~20% gravel; poorly sorted subangular to subrounded gravels up to 0.8' diameter of andesite and siltstone; medium dry strength, slow dilatancy, low toughness, no plasticity; many grass roots, organics, and foreign material (salts and glass); no reaction to HCl; lower contact diffuse over 0.2' (FILL)

SILT with sand (ML); very dark gray (10YR 3/1); dry; medium stiff; ~60% silt, ~35% sand, ~5% gravel, trace clay; moderately sorted; massive; sand is fine to coarse grained andesite and tuff; gravel increasing in abundancy near lower contact; medium to low dry strength, slow to no dilatancy, low toughness, no plasticity; several large roots, many rootlets; no reaction to HCl; lower contact diffuse over 0.2' (A Horizon in Colluvium)

SILT with gravel (ML); black (5Y 2.5/1); dry; medium stiff to soft; ~50% silt, ~30% gravel, ~20% sand; low dry strength, slow dilatancy, low toughness, no plasticity; poorly sorted; gravels are andesite and welded tuff clasts, subangular, 0.05' to 0.4' diameter; many roots and rootlets; no reaction to HCl; lower contact gradational over 0.3' (AB horizon in Colluvium)

COLLUVIUM (gravel/silt/clay conglomerate); light brownish gray (10YR 6/2) clasts with very dark gray (10YR 3/1) matrix; dry; medium dense; poorly sorted; clayey matrix towards the east; clasts are subangular weathered andesite and some welded tuff ignimbrite 0.05' to 0.6' diameter; ~60% gravels, ~40% matrix, matrix grading to more silty and sandy upslope to the west; few roots and rootlets; no reaction to HCl (Colluvium derived from Moraga Fm.)

ANDESITE siltstone with sand and gravel; dark grayish brown (10YR 4/2) to very dark grayish brown (10YR 3/2); moderately sorted; sand is fine to coarse grained; gravel is subangular andesite, <0.4' diameter, random orientation with no fabric; few roots and krotovina; no reaction to HCl, well defined lower contact (Moraga Fm.)

Unit Descriptions (continued)

ANDESITE; dark brown (10YR 3/3) with fresh, gray (10YR 5/1) exposed; moderately to slightly weathered; very weak to hard; ~80% gravel to boulders, ~20% sandy matrix between fractured clasts; boulders <2' diameter; andesite vesicles are filled with a black secondary mineral; blocky planar fractures with random orientation; weathering rinds on all surfaces; no reaction to HCl (Moraga Fm.)

SILT (lapilli TUFF) with sand and clay (ML); very dark grayish brown (10YR 3/2); dry; medium stiff; ~65% silt, ~30% sand, ~15% clay; several subangular andesite gravels intermixed; medium dry strength, slow to no dilatancy, medium toughness, low plasticity; sand grains are subrounded volcanic lapilli; no reaction to HCl; no pedogenic structure; lower contact diffuse over 0.1'; less silt and clay with ~25% gravel towards the west (Moraga Fm.)

SILTSTONE; brown (10YR 4/3) with some dark reddish brown (2.5YR 3/3); moderately weathered; very weak; moderately sorted; slightly mottled; siltstone is ~60% silt, ~25% sand, ~15% clay; coarse sand and trace gravel is subrounded to subangular sandstone; few roots; no reaction to HCl; faint angular blocky pedogenic structure; lower contact diffuse over 0.3' (Orinda Fm. or very old Orinda-derived colluvium)

CONGLOMERATE; dark yellowish brown (10YR 3/4); moderately weathered; very to extremely weak; clast supported; fine gravel to coarse sand clasts; subrounded to subangular <0.1' diameter clasts of sandstone with siltstone, tuff, andesite and trace shale, quartzite, and serpentinite; iron oxide and manganese weathering rind on surface of clasts; interfingering layers of siltstone 0.3' to 1.0' thick; siltstone equally intermixed towards west; few roots and rootlets; no reaction to HCl; lower contact diffuse over 0.5' (Orinda Fm.)

SILTSTONE; dark gray (5YR 4/1), dark reddish brown (2.5YR 3/4), and dark grayish brown (10YR 4/2); very to extremely weak; moderately to slightly weathered; massive with some mottling, medium plasticity; well sorted grading up to poorly sorted; slightly sandy with trace to 10% subrounded to subangular sandstone and siltstone gravels; interfingers with conglomerate unit; some volcanics intermixed towards

Bedding and Orientations

Appendix C-2a Lettis Plate 3

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LENNERT AND ASSOCIATES

SOILS ENGINEERS

3309 BROWNS VALLEY ROAD, NAPA, CALIFORNIA

707 · 252-9273 94558

Job Number 789
27 August 1979

Mr. Gaetano P. Russo
Department of Facilities Management
University of California
2000 Carlton Street
Berkeley, CA 94720

Re: Hill Area Dewatering Program

Dear Mr. Russo:

This letter presents a brief status report on the program to date, and confirms verbal directive received from the University in regard to the on-going drilling program.

The present status of Horizontal Drain No. 789-A is outlined briefly as follows:

GC-17

The hole was taken to a horizontal depth of 2,102 feet. A profile of the drain, with key information shown thereon, is presented on an informal drawing entitled "Horizontal Drain No. 789-A," dated 19 August 1979, attached.

A fault was encountered at 1,056 feet, as predicted; a maximum-seepage flow of 37 gpm was obtained from the fault. A basalt dike was encountered at about 1,085 feet, not predicted; a maximum seepage flow of 105 gpm was obtained at this point. The Moraga syncline structure was encountered as predicted; a maximum-seepage flow of 450 gpm was obtained upon first penetrating the massive flow rock stratum as encountered in Test Well No. 789-1. The University Fault was encountered at about 2,000 feet, as predicted; a maximum-flow rate of something in the range of 1,000 gpm was obtained at this point. The rock beyond the University fault was a clastic sediment, in comparison to the basaltic and rhyolitic flow rocks and tuffs encountered in the Moraga syncline; however, the sediment contained volcanic clasts and thus probably lies in the lower Moraga tuffaceous sediments rather than in the Orinda formation as predicted.

Sustained, essentially clear, water flow rates have varied from about 15 to 150 gpm. The 15 gpm minimum rate has continued for months, probably coming from the fault and dike at about 1,050 to 1,100 feet. The 150 gpm rate was observed after 24 hours with the hole at about 1,780 feet, where it first entered the massive

Centeral 12

Moraga flow rock stratum. The larger sustained flow rates, encountered at and beyond 1,780 feet, appear to have reduced due to plugging of the drill hole as much or more than due to rapid drainage of local "water pockets." Until the hole is cased full-length with perforated pipe, no valid estimate can be made of the probable long-term flow rate; but with present information it appears that the final sustained flow rate will be substantial if the hole is successfully cased to at least 2,000 feet.

Open voids have been encountered at a number of locations, apparently associated with faults; these voids strongly support our initial concept of open faults resulting from tension in the blocks between the Hayward and Wildcat faults. Some of these structures were heavily water-bearing, as at 1,785 feet. At other locations, the voids are apparently presently drained; all drill water and cuttings for about 250 feet of hole were "absorbed" by such a structure at one time during the drilling.

The 6-inch diameter casing was advanced with no insurmountable problems, using the under-reamer bit and drill-jack technique. On 28 June a slide at about 190 feet began to "bind" the casing; as the "bind" progressively worsened the casing could not be advanced beyond 1,200 feet. The casing was later pulled back to 1,100 feet, to relieve the "bind" and permit drilling through the casing; it is now "locked solid" at 1,100 feet. The casing was perforated in place in the 900 to 1,080 and 600 to 625 foot intervals.

GC-17 cont.

After completing the hole to 2,102 feet on 11 August, 4-inch perforated casing was installed beginning on 13 August. The casing advanced "dead loose" and without problems until a depth of 1,636 feet was achieved on 16 August. At this point "solid rock" was encountered. Probing three times with the 4-inch casing and four times with the 3 7/8-inch bit failed to recover the old hole. The hold had been open for several weeks at this point, and traversed four times with the drilling tools with no trouble. During the period 13 August through 15 August a total of five earthquakes occurred, ranging in Richter Magnitude from 2.0 to 3.3, with epicenters in the nearby Orinda area. There appears to be no reasonable doubt that the hole was offset due to movement of a fault, or large block of rock, during the period 12 through 15 August. As a result the hole must be re-drilled beyond the 1,636-foot depth if work on the drain is to be continued.

Since there is no "under-reamer" bit available for 4-inch casing, the hole cannot be advanced further with this casing in place; it was thus removed during 22 to 24 August. A test was performed to determine if 5-inch casing would pass the "bind" in the 6-inch casing at 190 feet; the test showed some "binding," but it is believed <u>probable</u> that the 5-inch casing can be run through the 6-inch casing. An alternate procedure is to re-drill the hole to 2,100 feet at 5 7/8-inch diameter, and again attempt to install 4-inch casing.

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In conclusion, the hole has been taken 100 feet beyond original target length, and the predicted geologic structure and seepage water conditions were encountered. Our original geologic and engineering concepts, as expressed in our report dated 17 December 1978, have been proven beyond any reasonable doubt.

The tremendous problems which we have encountered in installing the drain have arisen solely from difficulties in drilling and installing casing, and from instability of the rock structure in which the drain is being installed. The drilling and casing problems have been solved by devising a new technique, consisting essentially of drilling an oversize hole with an expanding bit, and jacking the casing into the hole directly behind the bit. In addition, the torque of the drilling equipment was more than doubled to provide sufficient power to overcome friction on the drill rods. The problems of ground instability, such as the slide at 190 feet and the fault offset at 1,636 feet, are beyond control, and pose a very serious hazard of total failure which cannot be assessed.

The water level in Test Well No. 789-1 has been periodically observed, to assess the effects of the horizontal drain on the ground water in the synclinal structure south of the University fault. The average flow rate in the well Shively No. 1 has been observed to monitor the deep ground water conditions in the geologic block north of the University fault. The results are shown graphically on an informal drawing entitled "Deep Well Data," dated 6 August 1979, attached. Referring to the drawing, the following major aspects of the data are commented upon briefly: GC-17 cont.

The initial, steeply dropping portion of the curve for the test well represents the drainage of drilling fluid. The intercept with the flat portion of the curve is at the "spillover" elevation of the synclinal major basalt flow rock stratum in the ridge. The flatter portion of the curve appears to be the normal "drainage curve" for the syncline for this season and time of year. The rate of fall stabilized at 0.9 inches per day from 14 June to 28 July, and the water surface then began to rise slightly. On 1 August the water surface began to decline again, at a stable rate of about 1.4 inches per day.

The major basalt flow rock body was first penetrated by the horizontal drain on 28 July, with an initial flow rate of 450 gpm, dropping to 150 gpm after one day and 87 gpm after two days. On 31 July the hole was found to be "plugged," and has not been "clear" since; the flow rate was 70 gpm prior to beginning drilling. The indicated medium-term flow rate without plugging is about 60 gpm; deducting 15 gpm for the structure at 1,100 feet, a flow rate from the basalt stratum of about 45 gpm is indicated.

The well Shively No. 1 shows a gradually increasing flow rate from about 11 1/2 gpm on 1 March, with a steeper rise beginning about

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1 May and a very steep rise beginning about 1 August. This flow rate curve is much different from that observed last year; see our report dated 17 December 1978 for the curve for last year. During the past two weeks the curve has "taken off," with a flow rate of 27.4 gpm on 27 August; this is unprecedented, startling, and indicates a massive rise in the ground water level during this period. The recent very rapid rise in flow rate could be related to the unusual seismic activity in this area, mentioned previously.

The curve for the test well indicates that either the horizontal drain produced no appreciable effect on the well, or that the water supply is so large that the effect is very small; while there can be no definite decision made with present data, we believe the second choice to be more probable. Only if the horizontal drain can be cased to 2,000 feet, and the results observed for several weeks or months, will we know for sure whether or not the drain is dewatering the structure tapped by the well.

The curve for Shively No. 1 indicates a massive rise in ground water level; since the well taps a major, widespread acquifer structure, it is reasonable to assume that this rise is occurring generally in the block north of the University fault, if not in the entire hill area. The horizontal drain should have no perceptible effect on the well, since it did not encounter a major acquifer north of the fault, as far as we could determine during drilling. It is reasonable to assume that the rise in ground water north of the University fault, as indicated by the well, will possibly produce a major slide in this area in the near future. The purpose of the contemplated second major horizontal drain is to dewater this structure and prevent such a slide problem.

GC-17 cont.

At this time we believe that the best way to proceed further with Horizontal Drain No. 789-A is to employ 5-inch diameter casing and an under-reamer bit, redrilling and casing the hole as necessary. A guess of the additional cost of this procedure is around $30,000, with no guarantee at all of the accuracy of this figure. The greatest hazard of failure of this procedure appears to lie in the 5-inch casing "binding" in the 6-inch casing at 190 feet, or the 5-inch casing being "locked" by another fault movement.

An alternate procedure is to re-drill the hole to 2,100 feet at 5 7/8-inch diameter, and again attempt to install 4-inch casing. This method is deemed somewhat less likely of success, due to our inability to drill an over-size hole for the casing if the original hole is "lost." Further, a fault movement which "locked" the casing would end all further effective operation. The additional cost of this procedure is guessed at $15,000, with no assurance at all of the accuracy of this figure.

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If the 5-inch casing is employed, and reaches some reasonably deep penetration, it may be feasible to run 4-inch casing through the 5-inch casing and thus complete the drain. Since we already have the 4-inch casing, the extra cost of this procedure would be nominal.

It is hereby confirmed that this office has been directed by the University to employ the procedure using the 5-inch casing. We have thus, on this date, placed orders for the 5-inch under-reamer bit and 5-inch casing on behalf of the University. The drilling crew is now on "home leave," and is to return on 5 September; if all material and equipment is then on site, work will resume on this date. The procedure using the 4-inch casing will be employed as a last resort, if for some reason the 5-inch casing cannot be advanced to the 2,000-foot depth.

It is necessary that a decision be made this week regarding the second major horizontal drain. If this is not done, any later decision to install this drain will entail a delay in starting of at least two months. A rough budget and schedule, with no guarantee of accuracy, will be prepared for the second horizontal drain if you decide to proceed therewith immediately after completion or final failure of the first drain.

GC-17 cont.

The severe problems, and great time and cost over-runs, experienced to date in this project lie solely in the difficulties of pioneering new drilling and casing procedures, and in the instability of the rock structures in which we are operating; while we have dealt with these problems, very effectively we believe, they are not within our control. We thus give no guarantees of cost, time, or success, as we did not at the start of this work. The writer has continued with this project, at great personal and financial cost, solely because there is no apparent alternative for slope stabilization in the upper Campus area, and the potential for a large slide appears so ominous that we dare not stop short of success or proven ultimate failure. Should you feel that the University has a more effective alternate to solution of the hill area stability problems, this office will be most happy to pass the baton to another runner.

Beginning in July, accounting and cost control was assumed by the University. Thus, while we continue to check and approve invoices for payment, we have ceased computing financial status statements.

Respectfully submitted,

B. J. Lennert

jel
Attachments

cc: Mr. Forrest E. Tregea
Mr. Richard M. Koch

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LENNERT AND ASSOCIATES
SOILS ENGINEERS
3309 BROWNS VALLEY ROAD, NAPA, CALIFORNIA
707 - 252-9273 94558

Job Number 789-A
28 May 1980

Mr. Gaetano P. Russo
Department of Facilities Management
University of California
2000 Carlton Street
Berkeley, CA 94720

Re: Slide at Centennial Drive Overpass
Progress Report

Dear Mr. Russo:

On 13 May 1980 the diversion pipe to carry water from Shively No. 1 to the storm drain inlet at the overpass on Centennial Drive was essentially completed, and the well flow was admitted to the pipe. The system commences with a 2-inch diameter Schedule 40 PVC line from the pre-existing 2-inch diameter line in the Fire Trail to Test Well No. 789-1, laid in a trench. A riser was installed at the test well to permit flow from this well to be put into the system if it is developed; a gate valve was installed just beyond the riser to permit pumping water from the test well to the fire system storage tank at Shively No. 1. From about 50 feet west of the test well the line consists of 2-inch diameter Wesflex Gold Label 80 psi polyethylene pipe, laid on the ground surface to the storm drain inlet; the surface line is anchored to #4 rebar stakes and trees with galvanized iron wire. Risers to admit air were installed in the polyethylene line at about 200-foot intervals, to reduce flow velocities and prevent undesirable hydraulic phenomena. The line is functioning well, and as expected, with no indications of undesirable hydraulic effects. The flow enters Mather Grove at the outlet of the culvert, about 100 feet below the overpass. Engineering design and field layout was provided by this office, and materials were purchased by this office for the University; installation was performed by University forces. Still to be accomplished is burying the pipe in the fire trail at the power-line tower, installation of a valve box over the gate valve at the test well, and some staking out and tieing at various points along the line; this is to be accomplished by University forces as soon as time permits.

With completion of the above work, any contribution of flow from Shively No. 1 to worsening ground water conditions in the Hill Area has been totally eliminated. The Campus is thus now no longer potentially contributing to development of dangerous ground water conditions in the Campus or LBL areas by reason of disposal of the flow from the well.

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On 28 May 1980 a plan, brief specifications and bid form, for regrading and repaving the slide area in Centennial Drive just below the overpass, were hand-delivered to the University. The work consists of removing the existing surfacing in the slide area and regrading and compacting the existing aggregate base subgrade, placing new aggregate base to new line-and-grade, and repaving the area; the guard rail is to be removed and re-installed on the south side of the road, and a new asphalt concrete curb is to be placed on this side. A new compound vertical curve, with 0.5 foot "hump," is being constructed in the slide area, similar to past major regrading, to reduce the frequency of major regrading as the past slow creep-slide movement continues. If acceptable bids are received next week, it is hoped that the work can be completed in no more than two weeks; this will permit re-opening the road around 16 June 1980.

The past, and recent, slide movements have grossly distorted the embankment below the overpass structure; maximum lateral deflection is in the range of 3 feet. In addition, small slope movements have reduced the roadway area width by up to several feet. With these conditions, the downhill lane can be restored to near-previous geometry, and considering the overall road design and condition, is deemed marginally tolerable; the uphill lane is much too narrow, and must be widened by installation of a retaining wall. This wall will be designed, and then bid, as soon as completion of the area regrading permits the required geometry to be accurately defined; in the interim, barricades must be placed along the shoulder of the uphill lane and the traffic speed limit reduced in this lane. By performing the regrading prior to constructing the retaining wall, we will be able to reopen the road to traffic some 6 weeks earlier than would be the case if the retaining wall were built first.

GC-18
cont.

On Plate I, attached, we have plotted the vertical slide deflection at the center of the overpass abuttment wall versus date; rainfall data supplied by LBL is also shown. Referring to the plate, it is seen that the accelerated slide movement commenced in February, some 10 days after the beginning of a period of heavy and continuous rainfall. The water from Shively No. 1 was being ejected into the canyon above the overpass at this time, and had been since last year. It is seen that the slide movement temporarily ceased some 12 days after the rainfall ended; it then resumed some 6 days after another day of heavy rain. Slide movement then ceased again some 9 days after the flow from Shively No. 1 was removed from the canyon, and has not resumed to this date. As described in previous correspondence, water in the canyon has been entering the ground at the New Fault, some 200 yeards northwesterly of the overpass; we believe that this water has been the key cause of the recent accelerated slide movements. We also believe that the water from Shively No. 1 entering the fault contributed to this causation, and was a substantial cause of the movement continuing until 15 May. At this time it appears that with installation of the pipe to divert the

Carbio et al

flow from Shively No. 1 stability conditions for the slide body have been restored to those pertaining in past years; we would thus infer that the past slow creep, at a vertical rate of about 3 inches per year at the overpass abuttment wall, will continue as before, slower in the summer and more rapid during the rainy season. However, it must be recognized that we have experienced three wet winters in a row; many signs indicate that the stress-field between the Hayward and Wildcat faults is periodically changing the deep aquifer conditions, and ground water conditions are now very severe by recent historical standards; there is thus the obvious possibility of an increase in slide creep-rate, or a major slide movement, at any time.

In consideration of the above information, you are advised that in performing the subject remedial work you are taking a calculated risk; if more rapid slide creep movement resumes, or if a major slide occurs, you will lose the value of the new work. Excepting for removing the flow from Shively No. 1 from the canyon, we have not taken any measures to improve stability conditions for the slide body; thus the previous slide conditions, perhaps worsened by the past three wet winters and recent tectonic phenomena, still pertain. The goal of the present work is simply to restore the road to usable geometry; mitigation of the slide conditions is far beyond the present budgetary limits.

GC-18
cont.

In past years the overpass structure has been progressively tilted to the east by creep-movement of a fairly large slide body occupying the canyon northerly of the structure; the distortion became so severe two years ago that structural failure appeared imminent, and this office installed steel reinforcing members to prevent sudden collapse. During drilling Horizontal Drain No. 789-A last year, the New Fault was encountered at 1,050 feet, and produced a large flow of water; this flow has continued, now at the rate of about 7 gpm, coming mainly from the New Fault. Referring to our hill area Geologic Map (revised 11/26/79), it is seen that this fault must supply (or drain) most of the deep ground water which activates the slide body. Shortly after the fault was tapped by Horizontal Drain No. 789-A last year, movement of the overpass structure ceased, and has not resumed during this past rainy season; contrary to the experience of past years, there has been absolutely no movement of the structure since last fall. We thus tentatively conclude that the drainage provided by No. 789-A has stabilized the slide body, and the structure is now comparatively safe, with the past serious threat of structural collapse eliminated. Barring a major change in deep aquifer conditions resulting from the stress field between the Hayward and Wildcat faults, it is our opinion that the overpass structure is no longer in hazard.

As described in our letter dated 13 April 1980, the present slide is a local embankment failure of the fill placed to form the roadway below the overpass. It has been creeping since it was first constructed, necessitating major regrading twice in about the past

Curtis et al 19

10 years. We have no reason to believe that stability conditions are any more favorable now than they were in past years, and they may be considerably worse. It is noted that flow from Hydrauger No. 2 abruptly ceased when the slide moved overtly in February; this is strongly suggestive that the drain may have failed, thus causing the slide, or that the slide may have sheared off the drain. We intend to rod-out the drain, to check it, as part of the present program, if funds permit. A major attempt to stabilize the slide would involve, at the least, drilling several 1,000±-foot horizontal drains into the slide area, in an attempt to provide deep and area-wide dewatering of the area around the fill embankment; this would entail expenditure of at least $100,000. A modest attempt to improve stability conditions would be implementation of our previous recommendation of placing a culvert in the canyon above the overpass and across the New Fault, to keep runoff from rain water from entering the fault; this measure would be appropriate under the present program if funds are available. An assuredly successful stabilization program, involving removing the fill embankment and underlying weak soils, and replacement with a stable embankment section, would involve a major incursion into Mather Grove and an expenditure of at least $500,000.

We have been attempting to clean Test Well No. 789-1, by blowing with air and use of commercial detergent, with little success to date. The space between the drilled hole and casing appears to be solidly packed with silt and clay, and rock fragments, originating from the tuffaceous rocks overlying the andesite rock aquifer at the 300- to 390-foot depth. We shall continue this attempt for another week, using both detergent and foam. If we succeed in cleaning the well, we will test-pump it to see if it taps a sufficiently extensive aquifer system to warrant permanent pumping. We cannot evaluate the potential yield of the well unless and until it can be cleaned. If we do not succeed in cleaning the well, we will abandon the attempt to pump it, but will retain the well as a piezometer to monitor the water level in the syncline. In the meantime the water level in the well continues to rebound to the 240-foot level between periods of blowing, a somewhat disturbing level but not apparently excessively dangerous. If the water level resumes the past pattern of rising at 3 or 4 inches per day, and reaches the 200-foot level, more drastic measures may be warranted. GC-18 cont.

In the past two years deep ground water levels, as evidenced by the flow rate from Shively No. 1, have peaked about the first part of June, in mid-July and again in September-October, with each peak successively higher; we do not yet know if Horizontal Drain No. 789-A, or the Test Well No. 789-1, will also show this pattern. At this time there is substantial reason to believe that this pattern will be repeated, with even higher levels possibly occurring due to the past three wet winters and on-going stress conditions between

Curtis et al 20

the Hayward and Wildcat faults. If this situation does repeat this year, there will be a condition of increased hazard of a major slide occurring at any of several locations during these periods of more severe ground water conditions. With accumulation of more data this year, we will be in a better position to evaluate this situation. Thus the present program of observations of ground water flow rates and embankment deflections, now being handled by University personnel, should be continued. GC-18 cont.

Respectfully submitted,

B. J. Lennert
R.C.E. No. 9232

jel

Attachment

cc: Mr. Richard M. Koch
Mr. Forest C. Timberman

Centsieral 21

LENNERT AND ASSOCIATES

SOILS ENGINEERS

3309 BROWNS VALLEY ROAD, NAPA, CALIFORNIA

707 - 252-9273 94558

Job Number 789-A
10 September 1980

Mr. Gaetano P. Russo
Department of Facilities Management
University of California
2000 Carlton Street
Berkeley, CA 94720

Re: Hill Area Stabilization Program

Dear Mr. Russo:

This letter presents a brief final status report for the dewatering and slide repair measures recently implemented by this office. Reference is made to letters from this office dated 26 June, 28 May, and 30 April 1980.

Recent measurements by University personnel have shown that the slide at the overpass on Centennial Drive is still moving, at a rate much higher than has been experienced in the past at this time of year. Ground water conditions in that area appear to be unusually severe, probably due to the past three wet winters and/or to stress conditions associated with the Hayward and Wildcat faults. Recent "rodding" of the old horizontal drains at the overpass (Hydraugers Nos. 1 and 2) has revealed that Hydrauger No. 2 is ruptured at 138 feet; this is on the projected surface of recent slide movement. Flow from this drain ceased abruptly when the slide showed a large movement last February. The water previously outletted by the drain is thus now "backing up" behind the slide, worsening stability conditions. It thus appears probable that the slide will move again sufficiently to necessitate closing Centennial Drive, either during the deep ground-water high in September-October or during the next winter rainy season. The only apparent remedial measures with a reasonable chance of success are long hydrauger drains drilled from Chicken Canyon or major regrading of the fill embankment, as described in previous reports; any such measures would entail the expenditure of a large sum of money. Replacing Hydrauger No. 2 might be helpful, but we feel that overall this would be inadequate to bring stability conditions back to the previous marginal level if we experience another wet winter.

GC-19

Centennial 22

The proposed retaining walls at the overpass slide have not been constructed. It is our understanding that you wish to hold this work in abeyance until the stability of the embankment is determined by further observations of the creep or slide movements.

The proposed culvert across the fault northerly of the overpass structure has not been installed. This culvert would prevent rain runoff from entering the fault, and would thus improve stability conditions at the overpass during the rainy season; the cost of this installation would be minor. We recommend that this culvert be installed prior to the forthcoming winter rains, if you wish to attempt to preserve the fill embankment at the overpass.

The attempts to develop Test Well No. 789-1 for pumping were unsuccessful. It appears doubtful that this well will yield sufficient flow to warrant pumping. If you wish to attempt dewatering with a well in this area, a new well located much closer to the University fault appears to offer the most probability of success. Due to the difficulty in assuring intercepting a major aquifer with a vertical well, we do not feel that the chances of success with this procedure warrant the cost, excepting only in a critical situation.

Horizontal Drain No. 789-A has apparently dewatered the slide body above the overpass sufficiently such that since the flow from the fault at 1,050 feet was developed the overpass structure has ceased to be deflected by the slide. It thus appears that, barring a change in the fault-permeability conditions, the overpass structure is no longer in hazard due to this slide movement.

It is our opinion that Centennial Drive in the area of the LBL Corporation Yard remains in hazard of slide movement due to high ground water levels and continuing changes in area fault-permeability conditions. The same is true of the Lawrence Hall of Science fill embankment, which is over-steep at about 1.35 to 1 slope, and lies in a very large Pleistocene slide body; this fill embankment is also considered to be potentially unstable during a major earthquake. Past measurements by University personnel indicate continuing slow creep of both embankments, ceasing in the dry season and increasing during winter seasons with heavy rainfall.

GC-19
cont.

Continued 23

NERT AND ASSOCIATES
SOILS ENGINEERS

Job Number 789-A
10 September 1980

Mr. Gaetano P. Russo
Page 3

Since you have no present expectation of drilling any more major horizontal drains, we are returning the under-reamer bits, which were developed for Horizontal Drain No. 789-A, to the supplier. These bits have been held, with the supplier's permission, pending further drilling.

It is our understanding that the program of dewatering and slide repair has now been terminated. The activities of this office in connection with this program are thus ended with issuance of this letter. Should you wish to retain the samples obtained in the past drilling programs, please so notify this office and we will deliver them to you.

Respectfully submitted,

B. J. Lennert

jel

cc: Mr. Richard M. Koch

GC-19 cont.

Cutiseral 24

BEN J. LENNERT
CIVIL ENGINEER • SOILS ENGINEER
(RETIRED)
CONSULTATION ONLY

30 June 1987

'87 ... -3

Mr. Gene B. Cross
Assistant Vice Chancellor
Department of Facilities Management
2000 Carlton Street
Berkeley, CA 94720

Dear Mr. Cross:

On 26 June 1987 Mr. John DeLucchi of DeLucchi Well and Pump Co. called me on the telephone and described apparent conditions at the dewatering well southerly of the Space Sciences Building, which I installed in 1975, which indicated that there may be a potential for failure and loss of the well; he called me because he knew that I had installed the well and he did not know that I had retired. This letter is being written because I have been advised by Counsel that if an engineer has knowledge of a hazardous condition and fails to inform someone at hazard, even though he has no connection with them, he may be liable under the legal doctrine of "failure to inform". This letter is addressed to you because I have been told that you are head of the appropriate department and I do not know of any other suitable person; by this letter I hereby inform you, and the Campus, in accordance with the presumed "obligation" described above.

GC-20

The information which I recieved from the driller, and which I remember from the past, is presented very briefly on the following two pages; I give no assurance as to the correctness or completeness of this information; the evaluations and judgements are given to fulfill my presumed "duty", and the same reservations apply.

It is the judgement of the undersigned that failure to continue pumping this well will result in appreciably increased hazard of embankment failure involving Centennial Drive and nearby downslope buildings; in the event of a major earthquake failure of this hill-slope area is virtually certain, with resulting life-hazard to those present in the area.

A reply to this letter is neither expected nor desired.

Very truly yours,

B. J. Lennert

B. J. Lennert
R. C. E. No. 9232

Copy to: Dave Wenner
Gene Metz
Dick Koch

Curtis and 25

3309 BROWNS VALLEY ROAD • NAPA, CALIFORNIA 94558 • (707)252-9273

BEN J. LENNERT
Civil Engineer • Soils Engineer

HISTORY AND CONDITIONS

The well was completed in April 1975. See our report for Job Number 734 dated 25 April 1975. The drilled depth was 475 feet; the casing length was 397 feet; the pump was set to 390 feet. The pump was a 10 hp Gordon hung on 3 inch pipe. The initial water level was at a depth of 172 feet from TOC.

The well was pumped continuously, and the ground water surface reached the bottom electrode level after a period of months. The well then held the groundwater surface between the electrodes. As far as we know the well has been pumped continuously since excepting for breakdowns and pump replacement.

The well was installed to lower the groundwater in the ridge area above the Lawrence Hall of Science and the LBL corporation yard, in response to previous and potential slide movements as well as "creep" in Centennial Drive and the Lawrence Hall of Science fill area. See our report for Job Number 789 dated 26 November 1979. As best I can recall the well lowered the groundwater surface from a depth of about 175 feet to 350 feet, and then produced between 10 and 20 acre feet per year. GC-20 cont.

DRILLERS REPORT

The Writers understanding of the gist of the Drillers report is as follows:

A new pump was installed something less than one year ago. Everything was the same as when the pump was replaced around three years previously.

This month, when a new pump was installed, the casing appeared to be "grossly distorted" such that the string "hung up" at one point until it then passed and "bumpiness" was felt over a considerable depth. Much scale from the casing was found in and on the pump and pipe, indicative of probable stress in the casing; fine rock fragments (sand sizes) were also recovered. All this is new since last year.

The Driller is concerned that the above may indicate impending failure of the casing and loss of the well.

The Driller believes that drilling and casing a new well may be difficult and slow.

The Writer does not gaurantee any of the above; you should deal directly with the Driller.

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BEN J. LENNERT
CIVIL ENGINEER • SOILS ENGINEER

EVALUATION AND WARNING

If the casing has deformed during the past year, since the casing is in bedrock the bedrock is presumeably deforming. The only apparent probable causes for this are tectonic deformation between the Hayward and Wildcat faults, greatly accellerated due to an impending major earthquake, and/or an extremely large developing landslide.

If the well is no longer pumped the groundwater surface will presumeably rise some 175 feet; this could pose a major threat to hillside stability and to existing buildings thereon, as well as to Centennial Drive; in the event of a major earthquake the result could be an order of magnitude increase in hazard to life and property.

In the Writers judgement drilling and casing a new well could take weeks. The new well must be some distance from the existing well to limit interaction during drilling; if located too far from the existing well and/or incorrectly, the new well could "miss" the higher permeability "target" and not suitably replace the old well.

The situation appears to be serious. At the least the existing well should be subjected to inspection by television camera and a "gyroscopic rabbit" to evaluate the condition of the well; if a potential for failure of the well is indicated a new well should be drilled and cased as soon as possible and/or other equal or more effective measures taken.

Apparently the well pumping rate and groundwater surface level have not been checked since the Writer resigned from this work in 1979. These should be checked in correllation with the above, and any indicated changes made in pump size, etc.

It is not certain at this time that the well is in danger, but the evidence does warrant the investigation described above; since installing a new well will be quite costly, it is not reasonable to do so unless the need is established. If the monitoring program maintained by the writer prior to 1979 had been continued, you would probably now know what has caused (or is causing) the observed phenomena; it appears that reinstating that program at this time is strongly indicated by the recently obtained data, as well as by the current concensus that a major earthquake is immanent in the Campus area.

GC-20
cont.

Centennial 27

Questions from the Appendices

Where are the specific reports, in January in draft form, mentioned in 4.5 p. 18? GC-21

Where is Alan Kropp 2009, mentioned in the Wm Lettis report on Bldg 25 but not included? GC-22

Alan Kropp 2007 (Bldg 85) advised tiebacks and drilled piers to strengthen Building 85. These would simply increase the number already there, drilled into claystone and siltstone, not bedrock. The consultants warn, moreover, of landslides in this area, especially seismically-induced. They found slumps and instability within mixed landslide deposits. See especially the charts on page 26 (2006A) where the stability is analyzed and fails under certain conditions. GC-23

The hazards to be mitigated.

4.5-19 "The proposed project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving **landslides**." Rather than suggest mitigation measures, the report promises more specific investigations. The trenches were too shallow to show anything save the presence of large volcanic rocks in a clay matrix, the sign of the caldera. GC-24

4.5-p. 24 Expansive soil. 2006 EIR determined soil was not expansive save in southern part of LBNL site, which includes Bldg. 85/85/A. Alan Kropp 2006A (for Bldg 86, between 83 and 85 and for 85) shows Atterberg Limits far exceeding those of non-expansive material. GC-25

Atterberg Limits were not cited for Bldg. 25 area. What are they? GC-26

Without consideration of the caldera and the past evidence of its instability, (the landslides of 1974 and the later problems of dewatering the hill during small seismic events: Lennert September 1980), these consulting reports and the mitigation suggestions are dangerously inadequte. GC-27

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March 15, 2010

Mr. Jeff Philliber, Environmental Planner
Lawrence Berkeley National Laboratory
1 Cyclotron Road,
Berkeley, CA

FOR THE LEGACY OF ERNEST LAWRENCE:

A REASONABLE AND SAFER LAWRENCE BERKELEY NATIONAL LABORATORY

The proposed Project entitled: " Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2 is intended to seismically strengthen an existing structure (Bldg. 85), and construct a 43,000 gross square foot General Purpose Laboratory (GPL) located at the Lawrence Berkeley National Laboratory. JMP-1-1

Indeed, it is timely to focus on seismic issues given the nature of the steep hilly terrain webbed with a dozen historic strike-slip faults that splay to the nearby creeping Hayward Fault Zone. it is admirable that the consultants provided clear and well-done images for this proposal, and more importantly for frameworking newer knowledges for future planning for the LBNL.

However, to strengthen just ONE building, build a new building and destroy some trailers does not make the remaining buildings safer. JMP-1-2 While it is a 'good thing' to provide seismically safe modern life science research space at the Berkeley Oakland hilly terrain land of the University of California is not at all reasonable --it is experimental. It is an experiment in human safety. JMP-1-3

Had the founder of the Radiation Laboratory, the Nobel Prized scientist, Ernest Orlando Lawrence (1901-1958) lived longer, he likely would have steered the course of the Lab to develop a world-class research campus at the flat more stable land of the Richmond Field Station.

The story is that Lawrence built the cyclotron east of classrooms and residences in virgin hills where people rarely went so as to absorb the escaping radiation--thus protecting human safety. It can be argued that it was never his intention to populate the Radiation Laboratory with more facilities, bringing more scientists, students, and support staff etc. near his radioactive experiment. He had tried to keep the campus community safer by moving his new experiments up into the hills. Dr. Lawrence was 58 years young when he died; some say from radiation harm. JMP-1-4

Just imagine constructing a planned research park at Richmond? The University's Mission Bay campus serves as a flat land prototype--with much space for expansion and for nearby businesses development.

Today, with the costly engineering to build, restore and modify existing facilities to meet current seismic safety guidelines, it would be prudent to change the Long Range Development Plan for upwards of 15 new buildings starting with the General Purpose Laboratory to site such at the Richmond Field Station.

JMP-1-5

Had, Dr. Lawrence known that the scattered building which constitute the National Lab would be built there and then named for him, Dr. Lawrence might scream, "Do not take my name in vain!"

JMP-1-6

The entity of the current Lawrence Berkeley National Laboratory can do better than patch-up disparate pieces. Make a new campus in a far safer zone--both geologically at less seismic threat and for public safety personnel to be enabled to manage a buffer zone perimeter far away from residences in the event of criminal behaviours.

JMP-1-7

A few useful questions:

Where does LBNL stand on the Homeland Security list?

JMP-1-8

Excluding Chevron facilities, where does the Richmond Field Station stand on the list?

JMP-1-9

What is the potential projection for intentional destructive acts at present at LBNL?

JMP-1-10

What elements are used to make such a judgement of no change?

JMP-1-11

Who in DOE has made the decision that adding more and more hi profile physics advanced technology facilities with more employees, more deliveries does not "up the ante" for targeting the proposed facility for a man-made destructive act?

JMP-1-12

One by one constructing new projects, impact by impact, the threat to the security of the people working on the LBNL site and people living and working close by increases doesn't it?

JMP-1-13

One by one, each 'new' facility designed and constructed at LBNL is widely publicized, packaged, and metaphorically 'sold.' We would be wise to respect the advice of geologists on threats from natural forces--seismic, fire, extreme weather of rain or upsurges of geologic water. land and mudslides and even killer heat waves.

JMP-1-14

We would be wise to learn about the potential threats from intentional destructive acts by humans that our law enforcement leaders KNOW they may have to respond to.

Would it be prudent to seriously asked local law enforcement leaders on how they would manage to control a destructive act at the Lab? Or a series in tandem? JMP-1-15

Creating a new campus site for LBNL much like UC Mission Bay in SF for medical and scientific research with a very wide protective perimeter would be a safer place to build out the 1 million square feet of new development described by Lab planners in the LRDP. Such would be seismically safer. JMP-1-16

It could be planned in collaboration with law enforcement leaders who are well aware of the "law enforcement nightmare" that is posed by the few narrow roads serving 3 Lab entrances. Inside, the Lab facilities are scattered on the landslide-prone terrain of Strawberry Canyon. JMP-1-17

Should mud cover the road, trees or the Western Power towers fall, the limited access, egress. from the North, South and East areas would likely have to be made on foot by public safety workers. And a firestorm? JMP-1-18

Publicity can be a 'double-edged sword'. Human intentional destructive acts do select target of laboratories, universities and government facilities to do harm that overflows to residential neighborhoods, children's museums and schools as well as harms scientists, support staff, and even First responders. JMP-1-19

Wouldn't developing a NEW secure site accessible from the Bay Trail on foot or bicycle, a 10 minute ride from the main UC Campus or El Cerrito BART by shuttle, with other nearby public transit and acres of parking spaces solve a number of gripes that scientists express? Wouldn't they be more tranquil and feel safer to persue their work? JMP-1-20

Would it be reasonable to design a new Lawrence National Laboratory with a LARGE PERIMETER that could be contained by law enforcement and other public safety personnel in the event of an intentional destructive act underway? JMP-1-21

One could imagine that Ernest Lawrence, Andrew Lawson (1861-1952), the founder of the San Andreas Fault and even Glenn Seaborg (1912-1999) Nobel scientist and a major figure in expanding the Lab would be most pleased!!! JMP-1-22

Crime drama scenarios with an array of 'blueprints' on destroying high tech facilities abound on nightly television and in computer games. Workplace violence at labs and universities is highlighted by news commentators every month. JMP-1-23

Although the narrative implies that present projects within LBNL on University of California land is within a secure site at present, public safety experts, criminologists and ordinary citizens who know the lay of the land of the steep Berkeley/Oakland hills, can easily see from their homes or even from a bus or car window that LBNL has no buffer zone for security of the facility.

It has a fence that anyone can crawl under, residential neighbors and a patchwork of security systems at various buildings. This proposed project will not be reasonably protected from Intentional Destructive Acts by humans more than any other building at the Lab. For another project, a description of a fence and controlled access at 3 entry gates with key and keypad for entry to the project site in the context of the existing security system in place is justified as 'secure' yet we know such an assertion is untrue; for years our exploring children short-cut their way through the Lab as they go uphill to the Lawrence Science Museum. JMP-1-24

We would all be wise to respect the land and groundwater, the faults that are expected by scientists to be faulting and to seek alternative sites to construct experimental laboratories in secure flat land with a wide buffer zone to protect the public from accidental and intentional releases of radioactive and toxic emissions. JMP-1-25

Creating a new campus site for LBNL much like UC Mission Bay in SF for medical and scientific research with a very wide protective perimeter would be a far safer place to build out the 1 million square feet of new development described by Lab planners in the LRDP. JMP-1-26

Experiments in physics are worthwhile, beneficial and deserving of safe facilities for scientists, visiting scholars, students and support staff to work in. Please honour Dr. Lawrence's legacy!

Thank you for your attention, JMP-1-27

Sincerely,

Jennifer Mary Pearson, Ph.D
1546 Milvia Street
Berkeley, CA 94709

COMMENT LETTER JMP-2

March 15, 2010

Mr. Jeff Philliber, Environmental Planner
Lawrence Berkeley National Laboratory
1 Cyclotron Road,
Berkeley, CA

FOR THE LEGACY OF ERNEST LAWRENCE:

A REASONABLE AND SAFER LAWRENCE BERKELEY NATIONAL LABORATORY

The proposed Project entitled: " Seismic Life Safety, Moderization, and Replacement of General Purpose Buildings, Phase 2 is intended to seismically strengthen an existing structure (Bldg. 85), and construct a 43,000 gross square foot General Purpose Laboratory (GPL) located at the Lawrence Berkeley National Laboratory.

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However, to strengthen just ONE building, build a new building and destroy some trailers does not make the remaining buildings safer. While it is a 'good thing' to provide seismically safe modern life science research space at the Berkeley Oakland hilly terrain land of the University of California is not at all reasonable --it is experimental. It is an experiment in human safety. JMP-2-1

Had the founder of the Radiation Laboratory, the Nobel Prized scientist, Ernest Orlando Lawrence (1901-1958) lived longer, he likely would have steered the course of the Lab to develop a world-class research campus at the flat more stable land of the Richmond Field Station.

The story is that Lawrence built the cyclotron east of classrooms and residences in virgin hills where people rarely went so as to absorb the escaping radiation--thus protecting human safety. It can be argued that it was never his intention to populate the Radiation Laboratory with more facilities, bringing more scientists, students, and support staff etc. near his radioactive experiment. He had tried to keep the campus community safer by moving his new experiments up into the hills. Dr. Lawrence was 58 years young when he died; some say from radiation harm.

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Today, with the costly engineering to build, restore and modify existing facilities to meet current seismic safety guidelines, it would be prudent to change the Long Range Development Plan for upwards of 15 new buildings starting with the General Purpose Laboratory to site such at the Richmond Field Station.

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A few useful questions:

Where does LBNL stand on the Homeland Security list?

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Would it be prudent to seriously asked local law enforcement leaders on how they would manage to control a destructive act at the Lab? Or a series in tandem?

Creating a new campus site for LBNL much like UC Mission Bay in SF for medical and scientific research with a very wide protective perimeter would be a

JMP-2-1 cont.

safer place to build out the 1 million square feet of new development described of by Lab planners in the LRDP. Such would be seismically safer.

It could planned in collaboration with law enforcement leaders who are well aware of the "law enforcement nightmare" that is posed by the few narrow roads serving 3 Lab entrances. Inside, the Lab facilities are scattered on the landslide-prone terrain of Strawberry Canyon.

Should mud cover the road, trees or the Western Power towers fall, the limited access, egress. from the North, South and East areas would likely have to be made on foot by public safety workers. And a firestorm?

Publicity can be a 'double-edged sword'. Human intentional destructive acts do select target of laboratories, universities and government facilities to do harm that overflows to residential neighborhoods, children's museums and schools as well as harms scientists, support staff, and even First responders.

Wouldn't developing a NEW secure site accesible from the Bay Trail on foot or bicycle, a 10 minute ride from the main UC Campus or El Cerrito BART by shuttle, with other nearby public transit and acres of parking spaces solve a number of gripes that scientists express? Wouldn't they be more tranquil and feel safer to persue their work?

Would it be reasonable to design a new Lawrence National Laboratory with a LARGE PERIMETER that could be contained by law enforcement and other public safety personnel in the event of an intentional destructive act underway?

JMP-2-1 cont.

One could imagine that Ernest Lawrence, Andrew Lawson (1861-1952), the founder of the San Andreas Fault and even Glenn Seaborg (1912-1999) Nobel scientist and a major figure in expanding the Lab would be most pleased!!!

Crime drama scenarios with an array of 'blueprints' on destroying high tech facilities abound on nightly television and in computer games. Workplace violence at labs and universities is highlighted by news commentators every month.

Although the narrative implies that present projects within LBNL on University of California land is within a secure site at present, public safety experts, criminologists and ordinary citizens who know the lay of the land of the steep Berkeley/Oakland hills, can easily see from their homes or even from a bus or car window that LBNL has no buffer zone for security of the facility.

It has a fence that anyone can crawl under, residential neighbors and a patchwork of security systems at various buildings. This proposed project will not be reasonably protected from Intentional Destructive Acts by humans more than any other building at the Lab. For another project, a description of a fence and controlled access at 3 entry gates with key and keypad for entry to the project site in the context of the existing security system in place is justified yet we know from our exploring children.

We would be wise to respect the land and groundwater, the faults that are expected by scientists to faulting and to seek alternative sites to construct experimental laboratories in secure flat land with a wide buffer zone to protect the public from accidental and intentional releases of radioactive and toxic emissions.

Creating a new campus site for LBNL much like UC Mission Bay in SF for medical and scientific research with a very wide protective perimeter would be a safer place to build out the 1 million square feet of new development described of by Lab planners in the LRDP.

Experiments in physics are worthwhile, beneficial and deserving of safe facilities for scientists and support staff to work in. Please honour Dr. Lawrence's legacy!

JMP-2-1 cont.

Thank you for your attention,

Sincerely, Jennifer Mary Pearson, Ph.D

1546 Milvia Street
Berkeley, CA 94709

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT REPORT, GENERAL PURPOSE BUILDINGS, PHASE 2 PROJECT, FOR UNIVERSITY OF CALIFORNIA, LAWRENCE BERKELEY NATIONAL LABORATORY, BERKELEY, CALIFORNIA.

SUBMITTED TO
JEFF PHILLIBER
UC-LBNL ENVIRONMENTAL PLANNER
ONE CYCLOTRON ROAD MS 76-234A
BERKELEY CA 94720

BR-1

BY
BARBARA ROBBEN
1964 EL DORADO
BERKELEY CA 94707
510-524-2383

15 MARCH 2010

COMMENTS ON D.E.I.R., SEISMIC LIFE SAFETY, MODERNIZATION, AND REPLACEMENT OF GENERAL PURPOSE BUILDINGS, PHASE 2.

THANK YOU FOR SENDING ME A COPY OF THE REPORT. IT IS A LARGE THICK DOCUMENT, BUT NICELY DONE. IT WOULD BE AN IMPOSSIBILITY TO COMMENT ON THE DOCUMENT WITHOUT HAVING IT IN HAND, SO I DO THANK YOU FOR THAT. IN THE FUTURE I THINK THAT IT IS IMPERATIVE THAT YOU ORDER COPIES ENOUGH FOR ALL INTERESTED AND AFFECTED CITIZENS. ALSO, I PERSONALLY RECEIVED A LETTER INFORMING ME OF BOTH THE DOCUMENT AND THE PUBLIC COMMENT SESSION, AND THAT WAS HELPFUL. I DO WONDER HOW MANY OF THESE LETTERS WERE SENT OUT, AND WHETHER THIS INFORMATION WAS AVAILABLE WIDELY, OR ONLY TO A FEW OF US WHO HAD PREVIOUSLY COMMENTED ON OTHER LBNL PROJECTS.

ALSO: IF THIS DOCUMENT IS ONLY A CEQA DOCUMENT, HOW WILL CITIZENS BE ABLE TO COMMENT ON THE NEPA DOCUMENT? PLEASE FORWARD TO ME THE NEPA DOCUMENT AS IT BECOMES AVAILABLE. p. 1-2

I ALSO REQUEST A COPY OF THE FINAL EIR FOR THIS PROJECT. p. 1-4

BR-1 cont.

BR-2

BR-3

PERHAPS WHAT IS CALLED FOR IN THE WAY OF DRAFT E.I.R. COMMENTS ARE SPECIFIC QUESTIONS SUCH AS:

> THE MAP ON p. 3-4 SHOWS THE BUILDINGS OF THE LBNL BUT IT FAILS TO SHOW ANY PART OF BERKELEY THAT CITIZENS MAY BE FAMILIAR WITH, BECAUSE ALL OF THE AREA SHOWN IS OFF-LIMITS TO US. IS BLACKBERRY GATE THE ONE AT THE TOP OF HEARST AVENUE? COULD HEARST AVENUE AND CENTENNIAL DRIVE PLEASE BE LABELLED? "OLD TOWN" IS MENTIONED IN THE TEXT, BUT IT IS NOT LABELLED ON THE MAP.

BR-4

INSTEAD, AGAIN AND AGAIN AS I READ YOUR DRAFT E.I.R., I AM COMPELLED TO SAY ONLY THAT:

> NO FURTHER CONSTRUCTION SHOULD TAKE PLACE UPON THE HILL.

BR-5

THE REGENTS ARE SCHEDULED TO CONSIDER THE FINAL E.I.R. AND THEY WILL HAVE THE DOCUMENT IN HAND FOR 10 DAYS PRIOR TO THEIR DECISION. THIS IS HARD FOR ME TO UNDERSTAND. WILL THE FINAL E.I.R. BE AVAILABLE TO ME BY THAT TIME? WILL OUR PUBLIC COMMENTS BE INCLUDED IN THE FINAL E.I.R. OR WILL THEY JUST BE SUMMARIZED AS THEY WERE ON p. 2-2.C, "AREAS OF CONTROVERSY".

BR-6

BR-7

THIS PRESENT DRAFT E.I.R. IS AN INTERESTING DOCUMENT, AN IMPROVEMENT OVER SEVERAL PREVIOUS LBNL E.I.R.s. THE PHOTOGRAPHS AND MAPS ARE CLEAR, AND THE WRITING IS WELL DONE. THAT LEADS TO THE QUESTION OF THE TOTAL COST OF PREPARING THE DOCUMENT.

BR-8

IT HAS BEEN SAID TO ME THAT COPIES OF THE REPORT ARE TOO COSTLY FOR DISTRIBUTION TO THE PUBLIC. BUT THAT IS THE PURPOSE OF IT!
SURELY THE COST TO PREPARE THE DOCUMENT FAR OUT-WEIGHS THE COST OF THE COPIES. THE LAB NEEDS TO PROVIDE COPIES IN RESPONSE TO HONEST REQUESTS.
IT IS MUCH TOO LARGE AND COMPREHENSIVE A DOCUMENT TO BE ABLE TO BE REVIEWED IN A LIMITED LIBRARY SETTING. LOOK AT THE EXPENSE OF PROVIDING COPIES THIS WAY: THE AVERAGE WORKER PREPARING THE DOCUMENT EARNS X DOLLARS PER HOUR.
WE WHO ARE REVIEWING THE DOCUMENT AND WRITING COMMENTS ARE SIMILARLY PUTTING IN AN EQUAL EFFORT. YOU DO NOT PAY US. BUT YOU SHOULD AT LEAST CONTRIBUTE ENOUGH DOLLARS TO OUR EFFORTS SO THAT WE CAN BE PROVIDED WITH THE DOCUMENT NECESSARY FOR OUR WORK ON IT.

BR-9

COMMENTS

"THE PROJECT AIMS TO PROVIDE SEISMICALLY SAFE FACILITIES ... REPLACING THE DEMOLISHED SPACE.... BUILT TO HIGHER SEISMIC SAFETY STANDARDS" p 1-1. A.

The problem here is that the site chosen is basically NOT seismically safe. It is wishful thinking to believe that a structure, however new and wanted, will ever be actually 'seismically safe' when the Hayward fault ruptures. Your employees there will be given a false sense of security, but because of the location of the project, will actually still be in danger. the other problem is that, inorder to strive for seismic safety in a basically un-safe location, larger amounts of money will be required - and that is our money, our taxes that are being spent to engineer this building; more money than if the buildings were located in a safer area. BR-10

"CONSTRUCTION OF THE EFFICIENT NEW BUILDING WILL ALLOW LBNL TO VACATE 36,000 g.s.f. OF OFF-SITE LEASED SPACE". p. 1-5.

The problem is that instead of moving lab activities away from this unstable and unsuitable area, plans are being made to move yet more people and activities in. This should not be done, in my opinion. If an un-safe building needs to be demol-ished, then do so in a safe way, but do not build additional buildings, whether you consider them to be "replacement" buildings or not. BR-11

CUMULATIVE IMPACTS p.2-9. F.

the combination of projects listed for the LBNL site along with those listed for the U.C. Campus is staggering in both number and size.
As a citizen of Berkeley with some hope of being able to continue living here, it is clear after reading these lists of projects that either quality of life will be seriously compromised, or that in a matter of time these two agencies will continue to encroach on previously privately owned property like a huge tsunami until there is nothing else left: just a gigantic monolithic U.C./LBNL Complex from one end of the city to the other, and no one left to pay the sewage and infrastructure bills. BR-12

To say that "an additional number of vehicles may possibly create need for a traffic signal" is to completely miss the impacts of this enormous building frenzy. BR-13

I'm thinking that nowadays U.C. might better stand for the "University of Construction" or the "University of Cranes".
Everywhere one goes, one is likely to find a construction fence along with a sign "No Pedestrian Access".
this is a great inconvenience to pedestrians, who then have to cross two additional streets to continue on their way. These barricades seems to be erected in a quite off-hand manner. Had the barrier been across a vehicle route, I'm sure arrangements would be made to accomodate the vehicles: not so with pedestrians. the most egregious example of this is on Hearst Avenue, where a barrier to pedestrian access has been in place for years. It also blocks BR-14

BR-15

one lane of street traffic, and my observation has been that the blocked off area is used only to accomodate the personal vehicles of construction workers, in other words, a parking lot. Yet it is Hearst Avenue which is always designated as the route of choice for demolition and construction materials for LBNL.

I would like to see this matter of the blocked-off lanes and side walk on Hearst Avenue specifically addressed in your E.I.R.

BR-15 cont.

4.5 GEOLOGY AND SOILS.

POTENTIAL PROJECT IMPACTS 4.5 - 16

I HAVE TO DISAGREE WITH YOUR DECISION TO LABEL THESE PROJECTS AS "LESS THAN SIGNIFICCANT" AS REGARDING THE RISKS INVOLVED.

SECTION 4.5-15 DISCUSSES THE SOIL TYPES (unstable), THE SLOPE OF THE LAND (30, 50, 75% slopes), AND THE EROSION (by which I suppose you mean 'landslide') POTENTIAL (highly susceptible).

FROM READING THE SOILS ANALYSIS SECTION I WOULD THINK THAT THE IMPACT OF BUILDINGS ON THIS SITE WOULD POSE 'EXTREMELY HIGH SIGNIFICANCE' RISKS. BR-16

I KNOW THIS ALSO FROM MY OWN KNOWLEDGE OF THE AREA SURROUNDING THE LBNL FENCE-LINE.

IT ALMOST SEEMS LIKE LBNL HAS NOT READ ITS OWN REPORT AT ALL. PERHAPS THERE IS A HOPE THAT NO ONE NOTICES THAT SOME CRUCIAL ITEMS HAVE BEEN DEEMED TO BE "UNIMPORTANT". THE MANNER IN WHICH SECTION 4.5-16 SO CASUALLY DISMISSES VERY IMPORTANT MATTERS, CASTS DOUBT ON THE VERITY OF THE ENTIRE DRAFT E.I.R.

THIS OPENS UP SEVERAL POSSIBILITIES FOR THE INQUIRING CITIZEN TO PONDER:

1. IF THE LAB RECEIVES A MAJOR PART OF ITS FUNDING FROM THE TAX-PAYERS IN ONE FORM OR ANOTHER, LBNL's CAVALIER ASSESSMENT OF THE RISKS MAY STEM FROM THE BELIEF THAT, SHOULD ANYTHING HAPPEN TO THE LAB FROM SOIL-CREEP, LANDSLIDES, EARTHQUAKES AND SO ON, THAT THE TAX-PAYERS WOULD PAY FOR A RE-BUILD, OR THAT THE TAX-PAYING CITIZENS ASSUME THE RISK FOR THE LBNL MANAGEMENT. BR-17

2. THE RESPONSIBLE ADMINISTRATORS NEED TO LOOK AT THE FACT THAT ANY NEW BUILDINGS, AND ANY OLDER BUILDINGS ALREADY ON THE SITE, MIGHT BE DESTROYED AND THAT IT COULD MEAN THE END OF LBNL.

BECAUSE INDIVIDUAL ADMINISTRATORS WOULD APPARENTY NOT BEAR THE RISKS OF THEIR UNFORTUNATE DECISIONS TO BUILD ON UNSUITABLE LOCATIONS, THEY ARE EXPOSING TAX-PAYERS AND THE NEIGHBORING COMMUNITY TO THE RISKS, INCLUDING THE ENVIRONMENTAL HAZARDS LBNL WOULD LEAVE BEHIND, SHOULD THE FACILITY COLLAPSE OR SLIDE AWAY DOWNHILL. THE ADMINISTRATORS WHO MADE THE BAD DECISIONS COULD WALK AWAY FREE AND MOVE ON TO JOBS ELSEWHERE.

BR-17 cont.

SEC 4.5 - 16. D.   4.5 - 9.

THERE ARE KNOWN FAULTS IN OUR AREA. WE CAN CERTAINLY ALL EXPECT SOME FUTURE SHAKING FROM MORE THAN ONE OF THEM, BUT TO CONTINUE TO PLACE MAJOR BUILDING PROJECTS SO NEAR TO THE HAYWARD FAULT IS COMPLETELY IRRESPONSIBLE. THE LIKELY-HOOD OF EXTREME SHAKING, LIQUIFACTION, LAND-SLIDING AND RUPTURE IS SO GREAT THAT THE WELL-INFORMED PRUDENT PERSON WOULD DESIGNATE THE WHOLE OF STEEP STRAWBERRY CANYON AS A NATURE PRESERVE. THIS WOULD ALSO BENEFIT THE TENS OF THOUSANDS OF STUDENTS AND FACULTY OF THE U.C.B. CAMPUS. **BR-18**

IT SEEMS THAT SELF-INTEREST, ALONG WITH LACK OF PLANNING, HAS ALLOWED INDIVIDUALS OR GROUPS TO PARCEL OFF SELECTED SITES IN STRAWBERRY CANYON ... BECAUSE IT IS "CLOSE TO THE UNIVERSITY CAMPUS AND FOLKS LIKE TO GO BACK AND FORTH EASILY".
THIS ARGUEMENT DOES NOT HOLD SWAY WITH THE PUBLIC AT ALL. **BR-19**

SEC. 4.5-8 ADDRESSES THE ISSUES OF ALTERNATIVE PRACTICES VERY WELL:

1. "AVOID CONSTRUCTION ON KNOWN FAULTS OR LANDSLIDES"...
2. "DISCOURAGE DEVELOPMENT ON SLOPES..."
3. "UTILIZE LANDS SUBJECT TO SEVERE SEISMIC AND GEOLOGIC HAZARDS FOR LOW INTENSITY PARK AND RECREATIONAL ACTIVITIES OR OPEN SPACE."
4. "NOT LOCATE PUBLIC FACILITIES FOR HUMAN OCCUPANCY IN FAULT ZONE AREAS..."

BR-20

3-17.6 "OFFICIAL STATE OF CALIFORNIA EARTH-QUAKE INDUCED LANDSLIDE HAZARD ZONE:"

"A SYSTEM OF BELOW-GRADE PIER FOUNDATIONS AND TIE-BACKS, AND ADDITIONAL BRACING AND GIRDERS, METAL CASINGS AND CONCRETE..." IS THE ENGINEERING SOLUTION TO THE PROBLEM, BUT IT OVERLOOKS THE COMMON-SENSE SOLUTION, WHICH IS NOT TO BUILD THERE. BR-21

'MODERN NEW BUILDINGS' AND 'SEISMIC STRENGTHENING' AND 'VISTA CORRIDORS' AND 'FOOD SERVICES' JUST MAKE THE SITUATION WORSE. NO MORE BUILDING SHOULD BE DONE ON THE HILL.
BUILDINGS, AS THEY BECOME OBSOLETE OR HAZARDOUS SHOULD BE REMOVED OR ENCASED IN PLACE, WORKING TOWARD THE GOAL OF EVENTUALLY RESTORING THE HILLSIDE TO ITS NATURAL STATE. A NEW TYPE OF THINKING WILL BE REQUIRED. BR-22

THERE IS AN HONESTY IN THIS E.I.R. THAT WAS NOT PRESENT IN SOME PREVIOUS LBNL DOCUMENTS:
SEC. 4.1-5 STATES: "LBNL IS LOCATED ON A STEEP HILLSIDE.."
"THE BUILT ENVIRONMENT IS A RESULT OF 'AS-NEEDED' CONSTRUCTION ... PATHWAYS ENCROACH ON SERVICE AREAS ... BOX-LIKE GREY METALLIC STRUCTURES..."
THESE DESCRIPTIONS SHOULD GIVE LBNL ITSELF PAUSE. BR-23

1. THE FIRST BUILDING WAS BUILT TO ACCOMODATE SECRET WW II PROJECT...
2. ADDITIONAL PROJECTS IN EVER-INCREASING AMOUNTS...
3. BUILDINGS ERECTED IN HAPHAZARD FASHION... BR-24

4. THE REAL REASON BUILDINGS ARE ADDED IS THAT IT IS CLOSE TO CAMPUS.
5. THE LAND IS OWNED BY U.C.
6. SCIENCE CAN ATTRACT FUNDS
7. A COMBINATION OF PROFESSORS AND THEIR EXPERIMENTS; GRADUATE STUDENTS LOOKING FOR EXPERIENCE WITH PAY AND LEADING TO ADVANCED DEGREES

BUT THE WHOLE THING IS BASED ON A HOUSE OF CARDS - THE LOCATION IS NOT SUITABLE!

BR-24 cont.

FIG. 3-5, AN AERIAL VIEW OF BUILDING 25 COMPLEX, THOUGH A LOVELY PHOTO GRAPH, IS SCARY IN THE EXTREME WHEN IT IS THEN POSSIBLE FOR AN ORDINARY CITIZEN TO VIEW THE CITY THAT HAS BEEN CONSTRUCTED UP THERE IN THAT CANYON. FROM WW II ONWARD, CONSTRUCTION APPARENTLY HAS JUST NEVER STOPPED. IT IS THE EVER-INCREASING NUMBER AND SIZE OF THE BUILDINGS THAT CONCERNS ME, ALONG WITH THE CONTAMINATION OF THE ENVIRONMENT AND THE POTENTIALLY HAZARDOUS NATURE OF THE EXPERIMENTS BEING CARRIED ON THERE. THE TOXIC LEGACY OF ALL THIS ACTIVITY HAS LEFT ITS MARK ON NOT ONLY THE SOIL OF THE LBNL, BUT ON THE GROUND-WATER AND THE SURFACE WATER WHICH IS SHARED BY ALL. BR-25

STRAWBERRY CREEK DRAINS THE CANYON BUT THEN FLOWS THRU THE CITY OF BERKELEY AND INTO THE BAY. U.C. STUDENTS DOING PROJECTS IN THE CREEK ARE INSTRUCTED TO WEAR PROTECTIVE EQUIPMENT BEFORE TOUCHING THE WATER OF THE CREEK. AND YET THE U.C SITE WAS ORIGINALLY SELECTED BECAUSE OF THE ABUNDANT FRESH-WATER SPRINGS SUITABLE FOR DRINKING WATER! WHAT HAS HAPPENED UP THERE? BR-26

4.0-2 3. "THE PROPOSED PROJECT WOULD RESULT IN RE-LOCATION OF APPROXIMATELY 100 U.C. L.B.N.L. PERSONNEL FROM A SITE ON POTTER STREET TO THE L.B.N.L. MAIN CAMPUS". BR-27

I believe that people should be re-located in the other direction: OFF the L.B.N.L. Hill Site.

4.0-4 TO 4.0-10. PROJECTS ON THE LBNL SITE.

THESE PAGES LIST THE 15 MAJOR PROJECTS PROPOSED OR UNDERWAY. EACH OF THESE PROJECTS INDIVIDUALLY IS HUGE, AND THE CUMULATIVE IMPACT OF THEM ALL IS FAR IN EXCESS OF THE AREA'S CUMULATIVE ABILITY TO BEAR THEM. THE CUMULATIVE IMPACTS ARE

TOO GREAT FOR THE CITY TO BEAR;
TOO GREAT FOR THE CITIZENS AND NEIGHBORS TO BEAR;
TOO GREAT FOR THE TAX-PAYERS ABILITY TO FUND;
TOO GREAT FOR THE AREA AND TYPE OF SITE;
and TOO GREAT FOR THE INFRASTRUCTURE,
TRAFFIC, NOISE, DUST, UTILITIES, SAFETY, SUNLIGHT, VIEWS, SCENIC VISTAS, LANDFILLS AND ALL ELSE LISTED IN YOUR D.E.I.R.

THE CUMULATIVE IMPACTS ARE IMMENSE. THEY ARE NOT 'LESS THAN SIGNIFICANT' IN ANY WAY.

BR-28

THE PHASE II GENERAL PURPOSE LABORATORY PROJECT SEEMS NOT TO CARRY AS MANY NEGATIVE ASPECTS AS SOME OF THE OTHER PREVIOUSLY PRO-POSED LBNL PROJECTS. HOWEVER IT REPRESENTS YET ANOTHER CONSTRUCTION PROJECT AND BUILDING CLUSTER ON THE HILLSIDE. IN SECTION AFTER SECTION THE REPORT STATES "OH, WE'LL PLANT TREES," OR "WE'LL COVER THE DEBRIS TRUCKS" OR "WE WILL RE-LOCATE ANY WHIPSNAKES WE FIND", AND THAT CAN LEAD THE CASUAL READER TO BELIEVE THAT ALL IS WELL ON THE HILL. BUT IT IS FAR FROM AN ACCEPTABLE OUT-COME FOR THE AREA AND THE CITIZENRY AS A WHOLE. THE HILLSIDE ALREADY IS MUCH TOO CONGESTED FOR SAFETY, BEING A LARGE, QUITE POSSIBLY TOXIC ~~EX~~PERIMENTAL COMPLEX SITUATED ON A DANGEROUS, STEEP, UNSTABLE HILLSIDE LOCATION. RELOCATING A WHIPSNAKE OR WETTING DOWN CONSTRUCTION DUST SOUNDS LOVELY, BUT IT OBSCURES THE LARGER OVERALL PROBLEM. BR-29

ADDENDUM TO MY COMMENTS. 10am 15 MARCH 2010

I HAVE JUST CALLED MR. MARK CHEKAL-BAIN, THE COMMUNITY RELATIONS DIRECTOR AT LBNL, TO INQUIRE ABOUT THE BEST METHOD TO SUBMIT MY COMMENTS, TODAY BEING THE DUE DATE... ONLY TO BE INFORMED THAT MR. CHEKAL-BAIN IS NO LONGER EMPLOYED AT THE LAB, HIS LAST DAY BEING FRIDAY.

YET IT WAS HE WHOSE CARD IS ATTACHED TO MY COPY OF THE DRAFT E.I.R., AND HE, ALONG WITH MR. JEFF PHILLIBER, WHO PRESIDED OVER THE PUBLIC COMMENT PERIOD ON FEB. 25. AS FAR AS I KNOW, NO ONE HAS HAD ANY FORE-WARNING ABOUT THIS CHANGE IN PERSONNEL.

I HAVE HAD SEVERAL QUESTIONS ANSWERED BY MR. CHEKAL-BAIN IN THE PAST, AND I WONDER IF THE ANSWERS I GOT FROM MR. CHEKAL-BAIN WILL STILL BE VALID. SO OFTEN IN THE PAST, WHEN DEALING WITH INSTITUTIONS, ONE EMPLOYEE WILL GIVE ONE ANSWER, WHILE A SUBSEQUENT PERSON WILL DENY KNOWLEDGE OF THAT AND INSTEAD WILL COME UP WITH SOMETHING QUITE DIFFERENT. I HOPE THAT WILL NOT BE THE CASE AT LBNL.

THIS ABRUPT CHANGE IN COMMUNITY RELATIONS DIRECTORSHIP JUST RE-ENFORCES MY OPINION THAT INSTITUTIONAL EMPLOYEES COME AND GO, AND THAT THEIR OWN PRIORITIES MAY TAKE PRECEDENCE OVER THE LONG-TERM WELL-BEING OF THE COMMUNITY AS A WHOLE.

BR-30

Dear Dr. Alivisatos:
I am alarmed by LBNL's plan to put 660,000 more gsf of Lab buildings on top of a collapsed volcano (caldera). Neither the caldera nor the slides of 1974, originating in a water-filled cavity of the caldera, are mentioned in the LRDP or the Seismic Safety 2 DEIR. In the event of the predicted major earthquake on the Hayward Fault, Lab buildings may be destroyed, as well as take the lives of many who live and work below on the UC campus and in the community. Also, the Hazardous Materials Facility (see DEIR), above the Botanical Garden and Strawberry Creek, should be removed before the earthquake event. The geology of LBNL's campus is extremely unstable, unfit for further construction.

JB-1

JB-2

JB-3

JB-4

JB-5

Yours,

Jane Barrett
Berkeley, CA

PUBLIC HEARING FOR EIR

FEBRUARY 25, 2010

PH-1

REPORTER'S TRANSCRIPT OF PROCEEDINGS
BY: JOANNA BROADWELL, CSR 10959

CLARK REPORTING AND VIDEOCONFERENCING

2161 SHATTUCK AVENUE, SUITE 201

BERKELEY, CALIFORNIA 94704

(510) 486-0700

BE IT REMEMBERED that on Thursday, February 25, 2010, commencing at the hour of 7:04 p.m. at the North Berkeley Senior Center, 1901 Hearst Street, Berkeley, California, JOANNA BROADWELL, a duly qualified Certified Shorthand Reporter, License No. 10959, in and for the State of California, reported the following proceedings.

--o0o--

PROCEEDINGS

MR. CHEKAL-BAIN: I am Mark Chekal-Bain. I am the community relations officer for Lawrence Berkeley National Laboratory. And welcome to the Seismic Life Safety Phase Two Project Draft EIR public hearing. We appreciate everyone coming out tonight. A couple of things before we start. The maps over there are courtesy of Pam Sihvola, who is a community member who brought those. I am sure she'll be talking about them during her public comment period later. The bathrooms are right out here. Unfortunately the screen on the stage is broken, so we have got this smaller screen. So those of you who have been with us before, it is smaller. If you can't see in the back you might want to move forward.

This presentation will be on the Internet tomorrow morning. So our goals this evening are to

PH-1 cont.

provide an overview of the seismic life-safety phase two project and to give community members an opportunity to provide input into the environmental review process that is required under CEQA.

I am giving the brief overview now, and Dr. Joe Gray will be talking about the research needs around this project. The objectives and plans for the project as proposed will be discussed by Jerry O'Hearn, our projects director, CEQA environmental process by Jeff Philliber, our environmental planner, and then we will have one and a half hours of public comment. PH-1 cont.

So we anticipate going to about 7:30 on our end, but we will have an hour and a half public comment if we need it. Every speaker, we ask if you want to speak tonight, Beverly here -- you can raise your hand. Beverly -- she has speaker cards. Please fill out your name and give them to her, and she will give them to me and Jeff. And I will call you individually.

Other ways to give input are to e-mail planning@lbl.gov, and send a letter to Jeff Philliber at Berkeley Lab. Beverly has a U.S. mail address for Jeff Philliber up there if anyone needs that. Again, this presentation will be on our website tomorrow morning if not late tonight at this address, and Beverly has that address for that as well for anyone who needs it.

For the public comment period, we do have ground rules that we have established. First we ask everyone to fill out a card. Everyone here, if you want to speak, will get a chance to speak. For that to happen we allot three minutes per speaker. And we ask that you not defer your time, like I know happens sometimes at Berkeley City Council meetings. You may not defer your time. And we ask that you be respectful to all speakers with no interruptions or profanity. If you do run out of time, since this is a small group tonight, so I am sure we will have more time later if people feel rushed in three minutes, we can do another few minutes later.

PH-1 cont.

Any questions on the ground rules or the logistics for the evening before I turn it over to Dr. Gray? Okay.

MR. GRAY: Well, good evening. I am Joe Gray. I am the Life Sciences division director at the Lawrence Berkeley National Laboratory. I am also an adjunct professor of laboratory medicine at the University California San Francisco.

And I am really delighted to have an opportunity today to talk to you about some of the aspects of the Life Sciences Program that I think will be impacted by what we discuss tonight.

The Life Sciences Program at the Berkeley Laboratory, I think, addresses a number of issues that I believe are fundamentally important both scientifically and really through the community at large. One of the major programs that we have at the Laboratory involves cancer research. And historically this has been a program that delved into the basic aspects of a variety of cancers but with particular interest in breast cancer.

It started by looking at some of the fundamental biological characteristics of this disease and trying to understand what goes wrong as we develop cancers. What is happening more recently in the program is that we have expanded the program to include aspects of moving this information into ways that we think can effectively improve the management of the disease.

PH-1 cont.

So we are beginning to explore such things as how the environment influences the instance of cancer. Can we do a better job of detecting cancers early at a time when they can be more readily treated? In particular we are interested in what we call a pathosis-prone cancers, those that are going to be lethal. We have a major program aimed at that area.

And then finally we have launched, really, an international program aimed at trying to figure out how to personalize cancer treatment, how can we identify drugs that are going to be effective in particular cancers, and how can we make markers that allow us to identify which cancers to treat with which drugs.

We have a major program in fundamental biology, a continuation of the long legacy of the National Laboratory investigating how life works. It is some of these basic insights into the biology of life that we are beginning to apply in some of these other areas. In collaboration with UC Berkeley we have a major neurosciences program. In particular we are interested in trying to improve our ability to understand neurodegenerative diseases like Alzheimer's, how can we detect the onset of Alzheimer's earlier, how can we understand its characteristics and how can we use that information to mediate the disease.

PH-1 cont.

And finally we have a major program at the Laboratory in bioenergy and environmental cleanup. The Department of Energy is very much investing in bioenergy. I think this is one of the fundamental problems society faces in the future, and the Laboratory has a major insight on biology there on improving energy solution.

So what do we need to do? One of the things that I think the Laboratory really specializes in is bringing advanced instrumentation to understanding some of these complex problems that we are dealing with. These really are some of the most complex problems that I think mankind addresses.

In order to understand these complex life situations, you need to have the best in measurement science technology. And the Laboratory as a whole specializes in this. We are world experts in light and electron microscopy using a whole variety of imaging technologies that allows you to diagnose cancer. And we specialize and bring all of these really state-of-the-art technologies to bear at the problems at hand.

In order to address these really complicated problems that we have before us, this is not something that can be done, in my opinion, by an academic laboratory. This requires teams of people who have skills in a variety of different areas. So I think that the kind of science that is going to be done in the future that really is going to help us make progress on these complex problems is going to require we have cooperating teams, the biologists, chemists, occupational biologists, physicists, and we need to have strong collaborations between the Laboratory and participating academic institutions and, indeed, the private sector.

PH-1 cont.

One of things that the laboratory specializes in is being able to pull together the kinds of teams that are going to have the ability to address these big problems of our time. So the problems that we face in doing this are substantial. And just to bring a couple of these to your attention, one of them is that in order to be able to accomplish this kind of team science, you have to have people interacting together on a regular basis.

One of the challenges that we face in our research is, remarkably, this occurs in 11 different buildings around the site. What this means is that there are substantial distances between the people who really ought to be interacting on a daily basis. So that keeps us from doing that. It keeps us moving back and forth around the city. And I think this is the problem that we are continually facing.

The other problem we are dealing with is many of our buildings are quite old, decades old, and in many cases structurally inefficient. I think this is very much a health consideration for those of us who work in them. And they certainly do not meet the needs of modern science. So this is a situation, I think, that we have got a great internationally-respected program that addresses some important societal needs, that we have some infrastructure problems that need to be addressed. With that I thank you for your attention. **PH-1 cont.**

MR. O'HEARN: My name is Jerry O'Hearn. I am a project director for the Seismic Life-safety

Modernization Project. The project objectives include the safe, modern, flexible life-safety remedies for risks in general purpose research facilities and lab-wide resource buildings without resulting in net decrease and will consolidate approximately 100 research staff from these buildings back to the LBNL site. And we will demolish seismically-rated very poor space along with antiquated trailers.

The proposed project scope will replace seismically unsafe buildings with a new, modern and energy-efficient general-purpose laboratory. GPL will stabilize Building 85 slope and demolish very seismically-poor spaces along with antiquated trailers. This is a pictorial of the Lawrence Berkeley National Laboratory.

Building 25 and 25B will be demolished with the very poor building in the center of the Laboratory. There is an urban slope that is unstable during a seismic around Building 85. We'll be stabilizing that. The proposed general-purpose laboratory will go on the infill site on Building 25, 33,000 gross square feet. We will demolish five trailers at Building 61, and then Building 50, at the end of the project. After that building is

PH-1 cont.

vacated it will be demolished like that building.

The new general purpose laboratory, we are proposing a project location of the existing Building 25/25B site. That is the site that has been proposed. We moved the GPL from the previously proposed site in Strawberry Canyon. This proposed site is an infill site, a three-story building about 43,000 gross square feet, 130 occupants. We're planning for the groundbreaking. The current design will outperform energy standards by over 50 percent and the project will not increase that.

This is an aerial view, so at the right on the slide, the center of the slide is a combination view of the Building 25/25B and also the site of the proposed site for the general purpose laboratory. And this is an artist's rendition of the west elevation of the general purpose Lab.

PH-1 cont.

Building 85 slope stabilization, this part of the process will stabilize ancient landslide deposits that could move in the event of a significant earthquake. An underground system would be installed such as a drilled pier foundation. And this is an aerial view. This is Building 85, and the orange lines below create an underground system of retaining structures.

So the buildings to be demolished, this is a slide of

Building 25, with 25 square gross feet, built over five phases starting in 1946. The building today is vacant. The seismic rating is very poor. This is Building 55. It is 19,000 gross square feet. This life sciences building is occupied with the Life Sciences Program today, built over seven different phases. The seismic rating is poor. Finally this is the picture of one or two of the buildings at Trailer 71. They were installed over 30 years ago.

So our preliminary schedule, phase demolition starts in 2010. The general purpose laboratory construction starts in 2011. Building 85 slide stabilization, that work starts in 2011. The project will be complete in 2015.

Thank you very much.

MR. PHILLIBER: Hi. My name Jeffrey Philliber. I am the Lab's environmental planner. The purpose of the meeting tonight is there is CEQA and also the University policy and to give you a chance to talk and for us to listen. As you see, we have a court reporter who will be reporting everything that you say today. We'll consider everything that is said, and we will put everything in the final environmental impact report and will respond to your comments and questions in that document.

The way we generally conduct CEQA meetings is we will

PH-1 cont.

start with a presentation, a brief presentation of the project or action to be undertaken. Then we will explain the environmental process along with present a brief overview of the document of this EIR, which is what I am doing here, and then, as Mark pointed out, we will open up the majority of the meeting to your questions and comments. That will be recorded.

UNIDENTIFIED SPEAKER: You will answer questions?

MR. PHILLIBER: In the CEQA process in the environmental report, we start with the scoping period. We issue a notice of preparation, which is a project description of what we are proposing. That is sent out along with some sort of initial study that gives our sort of best guess of what the environmental issues are going to be. We distribute this widely to agencies in the public.

PH-1 cont.

We held a scoping meeting which many of you attended last year. We take your comments and we consider those as the draft EIR is prepared. The draft EIR is then again distributed to the public for a 45-day period along with agencies. We hold a public hearing, which is what we are doing tonight.

We have comments, we also take the written and e-mail comments during the 45-day period, and we

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put each of them into the final environmental impact report called a Final Response to Comments document.

And we respond accordingly. The final EIR, once it is completed, then is made available for the public to look at before it goes to the Regents. And finally the document goes to the Regents. If they decide to approve it, they certify it. They also have the option to not. At the same time we also consider approving the design in this project.

These are just the rough dates associated with this process. The scoping process was held in the beginning of December of '08 and continuing through January 2009. The draft EIR, of course, was circulated starting January 29th of this year, and the comment period closes March 15th. The final EIR should be made available sometime in April, and we are expecting to go to the Regents meeting which will be on May 9th in San Francisco.

UNIDENTIFIED SPEAKER: When is the public comment period again?

MR. PHILLIBER: That ends March 15 for the draft EIR. This is just a brief list of the major issues that are considered. In the environmental impact report, of course, you look at it and you will see all of these individual chapters. It was

PH-1 cont.

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only one significant unavoidable impact that was found through our analysis in the EIR. And that has to do with cumulative traffic impacts for four intersections, four intersections are all along the Gayley Road between the University and the Lab. They are, just briefly, Durant and Piedmont, Hearst and Gayley and La Loma, Gayley and Stadium Rim Way and Bancroft and Piedmont.

They are significant and unavoidable, significant, although we project a very minor increase of peak commute-hour traffic to those intersections. The way that CEQA significant criteria reads, we concluded it is, nevertheless, significant. It is unavoidable because even though we propose mitigation, the mitigation is not in our power to enact. We pledge to contribute our fair share to the mitigation, but, again, as a technicality of CEQA, we cannot call it avoidable because we cannot initiate the mitigation. **PH-1 cont.**

This document also has one additional feature which serves as a supplementation of the 2006 environmental impact report. And just briefly what that means is that when we do the 2006 environmental impact report, the Bancroft and Piedmont intersection was not projected to be at a

certain level of service in the year 2025. The circumstances have changed between now and then. We have concluded that there would be a level of service degradation sufficient to find that situation unavoidable. So we added that to both documents through this one. Again, so it is -- you can take a look at that. It is woven throughout the document.

We consider a broad range of alternatives including off-site alternatives and project alternatives. There is also, in parallel independent of the CEQA process, there is a process under the National Environmental Policy Act or NEPA taking place currently under -- by the Department of Energy. They are expecting to have a draft environmental assessment be issued sometime probably in the next month. If you have any questions about that document or process, we invite you to direct them to the Department of Energy Berkeley site office. And the address is on the board there. I see some folks are writing it down.

PH-1 cont.

UNIDENTIFIED SPEAKER: Jeff, do they send notification when the NEPA document is available?

MR. PHILLIBER: I believe a notice of availability will be issued.

MS. SIHVOLA: Is it possible to comment on the document?

MR. PHILLIBER: If it is a draft EIR, yes.

MS. SIHVOLA: So you think it is going to be out in a month?

MR. PHILLIBER: I can't speak anymore because it is their process. Like I said, if and when they issue any NEPA documents I would certainly be notified. Again, if you have further questions please contact them. I am sure they would be very pleased to answer you, to answer the questions.

MS. SIHVOLA: The Regents don't really deal with NEPA.

MR. PHILLIBER: Correct. I just wanted to say one more thing about the CEQA process. I know that we have been here doing it the 12 years that I have been at the Lab. And I know on several occasions folks have voiced a question as to whether the CEQA process has meaning or if it is taken seriously. At the same time I want to address the fact that it has taken a year to go from the scoping process to a draft EIR because I saw several eyebrows raised when the slide went up.

PH-1 cont.

And I want to point to one feature of the project. Generally the project I think was

generally well received except for one particular aspect of it. And that was the location of the GPL which at the time was proposed to be at the corner, that area of Strawberry Canyon that was adjacent to the UC Botanical Gardens which was very controversial. We heard a lot of concerns from many of you folks here at our scoping meeting and also the comments.

As a result of that, that CEQA process and also just the fact that we are always -- we don't rest, we are always planning, we reevaluated the location of the GPL and came up with a new preferred location for it which Jerry mentioned in his presentation. It is in the heart of the Lab. It is in what is called Old Town. It is a completely newly-developed site. It is outside of what we traditionally think of as Strawberry Canyon.

I want to say that the CEQA process is something that we do take very seriously. We do listen very intently to what you tell us. There are times when, again, you follow the CEQA process. Changes can occur that I think most people are pleased about. So having said that I want to encourage you to continue engaging us in the CEQA process. We look forward to hearing what you have

PH-1 cont.

to say. Thank you.

MR. CHEKAL-BAIN: Okay. So now we are going to start the public comment period. First of all, I want to ask people to turn off their cell phones which I will do. So Marissa over here is going to be our timekeeper. She is going to sort of flag me when you have 15 seconds left, and I will flag you. If my hand goes up it means you have 15 seconds left. You should wrap up what you are saying.

And so, first of all, for the few of you who came in later, to speak tonight you need to fill out the card. Beverly over there has the cards if you want to turn one in. And if you want to speak, please do so now. Everyone will get a chance to speak, three minutes per speaker. We ask that everybody is respectful to one another and no interruptions and no profanity. As Jeff said, we have a court reporter here, so if you can please say your name slowly and clearly. And if it is a difficult name just if you can spell it out that would be helpful.

PH-1 cont.

I am going to leave this slide up here, which is how to contact us for the evening, and, of course, I will go back to the ground rules if I need to. So any questions on how the public comment

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works? Sure. Go ahead.

UNIDENTIFIED SPEAKER: Can people pass time off?

MR. CHEKAL-BAIN: No. You may not pass time off to someone else. But if you don't finish speaking after three minutes, I will anticipate, based on the size of the group, you will have time to come up a second time. We are going to end at nine no matter what, but I am pretty confident those who want to speak twice will be able to.

There are some maps that Pam Sihvola is going to be using in her presentation when she has her three minutes. With that, Beverly, do you have cards for us? So I will be calling the name of the person speaking and then the person on deck, if you will.

So first speaker is Susan Samson. And the second speaker will be Barbara Robben. Oh, you are going to go up there at the microphone right here.

PH-1 cont.

MS. SAMSON: My name is Susan Samson. Although I come here as a 45-year Berkeley resident who has witnessed many changes in our community. I come here primarily as a science advocate. I am involved with the UCSF program. I am here to address a critical issue between my role as an

PH-2

advocate striving to define the promises and transportation of the Genomics Medicine Initiative, how the seismic life-safety replacement of general purpose buildings can benefit the community and more effectively influence innovation in the life sciences.

I actually bring to the table voices of many people who share the core belief that the Berkeley Academy of Sciences has boldness, vision and a sense of urgency. Many have argued that the next century of scientific technological innovations will be most profound in life sciences, and, as Joe mentioned, bringing state-of-the-art measurement to address the critical problems of our time.

LBNL holds a critical role in improving the research process for selected cancers and focuses on systems and biologic approaches to highlight mechanisms that influence individual responses to therapies. Powerful genotyping tools have allowed LBNL researchers to assemble information about gene abnormalities in breast cancer through genotyping tools that provide biomarkers.

Researchers will detect metastases from breast cancers before they are metastasized. This work contributes to all our well being, and LBNL

PH-2 cont.

must continue to take a leadership role. However, although LBNL is poised to do great things in this emerging age of personalized medicine, it can only do so if its research needs are met.

The new seismically-safe modern building will improve efficiency and consolidate functions and will create a lifestyle that will ultimately help, for example, or accelerate the understanding of the molecular basis of cancer through the application of geno-analysis technology. I am pleased that the serious consideration about how to address scientific and practical challenges including traffic impacts is beginning now. I thank you for your attention.

PH-2 cont.

MR. CHEKAL-BAIN: Thank you. Next we have got Barbara Robben and Gene Bernardi.

MS. ROBBEN: Is there any way I can turn to address the audience? There is about twenty of us back here. I don't know what you look like, but I know what your back looks like. And I would also like a place to rest my document, if possible.

MR. CHEKAL-BAIN: The reason we do it this way is we are actually the agency, if you will.

MS. SIHVOLA: Put the microphone up and let her speak from there.

PH-3

MR. PHILLIBER: If she speaks into the microphone everyone should hear.

MS. SIHVOLA: Put the microphone over there.

MR. PHILLIBER: We will make sure everyone can hear. If you like we can hold the document for you.

MS. SIHVOLA: Put it over there. It is not a big deal.

MR. CHEKAL-BAIN: So --

MS. SIHVOLA: It is not a big deal. This is our meeting, guys.

MR. PHILLIBER: We are going to go ahead and continue. This is the way we always do it. We are the audience.

MR. CHEKAL-BAIN: We are going to go forward. So Barbara Robben and then Gene Bernardi.

PH-3 cont.

MS. ROBBEN: Well, first I want to thank you for your document I received. It is, indeed, a beautiful document. I don't know how many of you have seen this. One of my concerns is whether the people that really would be interested in this or affected by this would be aware that this meeting is taking place and there is documents available. So thank you for listening.

PH-4

And then to address the subject matter of

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the document, I would say LBNL wants to put more buildings up in Strawberry Canyon, and the fact that it is a canyon should give you folks pause because it is not the place that you want to put a lot of buildings. A canyon really implies steepness, which you have up there, and we know that not only is the Hayward fault nearby, but it is very -- a lot of

PH-5

PH-6

landslides have happened, and they are going to be happening. And then to avoid that in order to build the building that has a chance of being safe up there you are pouring a lot of money into reinforcing the foundation, which is basically taxpayer money. So we might better be spending it on reinforcing our own foundations.

PH-6 cont.

PH-7

But it is going to build evermore buildings on the hillside, which is hazardous. So looking at the historical part of why the University was even located up where it is is because there is a multitude of springs up in Strawberry Canyon. The idea was that they were supposed to get their water from that supply. So as you fill the canyon with parking lots and buildings and so forth you know there is going to be water there.

PH-8

PH-9

So in the past there has been landslides, and there has been a well built to rid the area of

water accumulating. That water slides down into Strawberry Creek, goes through the campus. I know the campus has got restriction in case anybody wants to do a project in Strawberry Canyon, they advise waist-waders and rubber gloves. So that is not totally (inaudible) water that is being pumped out of the Canyon.

PH-10

PH-11

So there are many reasons why I think that the University and the Lab and the DOE, whoever is involved, should not be putting more structures up in the Canyon. I think when you talk about collaboration, that is not really as significant as the fact that if you should be -- if you are going to demolish anything at all, you should be moving out of the Canyon to other locations if there are, indeed, other locations.

PH-12

MR. CHEKAL-BAIN: 15 seconds.

MS. ROBBEN: Thank you for my 180 seconds.

MR. CHEKAL-BAIN: Next we have Gene Bernardi and then Georgia Wright.

MS. BERNARDI: I am Gene Bernardi of the Committee to Minimize Toxic Waste. And I wish to address the so-called seismic safety plan for the hazardous waste-handling facility. Replacement of the hazardous waste-handling facility, of the

PH-13

replacement of hazardous waste facilities, which is replacing existing hazardous waste, should never have been built in its presents location situated behind Lawrence Berkeley Lab's east gate on the Wildcat fault, which area is in the City of Oakland.

In order to build this non-nuclear facility for the storage of radioactive and hazardous waste, it was necessary to do at least four things, one, ignore the Wildcat fault. Two, ignore the safety implications of slope stability problems. Three, failed to do a supplementary EIR when two major changes were made to the original EIR, namely, building a non-nuclear facility for storage of radioactive and hazardous waste and moving the fence-line a considerable distance from the existing fence-line around the hazardous waste-handling facility.

So, first of all, it was built on the Wildcat fault. They were aware of this, if not under their own knowledge but through public comments. They ignored the safety implications of slopes' building problems, this despite number one, the Lab's own revelation in response to public comments IS-7, which indicated that a slide 50 feet long by 100 feet wide occurred along the access road

PH-13 cont.

to the side of the replacement facility in the winter of 1994, '95. That is not ancient, which is what I heard a few moments ago. And, number two, the knowledge provided in public comment of the University of California press release that reported that Centennial Drive, which connects to the access road which the handling facility was closed for eight months in 1993 and 1994 due to a huge slide, again, not ancient.

Three, failure to do a supplementary EIR when two major changes were made to the original EIR, first building a non-nuclear facility for storage of radioactive hazardous waste because the Department of Energy's western division, quote, determined that the benefits of constructing a nuclear facility do not justify the additional cost, unquote.

Surely a nuclear facility has more safety features than a non-nuclear facility. Is safety not worth the cost? In order to fall below the threshold for category 3 non-reactor nuclear facilities --

PH-13 cont.

MR. CHEKAL-BAIN: I need to cut you off. But your time is up.

MS. BERNARDI: My time is up? We will have

to continue later. Thank you.

MR. CHEKAL-BAIN: So the next we have got is Georgia Wright and then Garniss Curtis. Georgia Wright then Garniss Curtis.

MS. WRIGHT: I am Dr. Georgia Wright, a member of Save Strawberry Canyon. And I would like to point out that the objectives for this seismic safety phase two begin with to provide a safe modern scientific, et cetera. Thereafter if we look at

PH-14

PH-14 cont.

some of the findings in your appendix, it certainly looks as though all of the "safe" business has just been brushed under the rug.

PH-15

I have been reading those geotech reports, and there are astonishingly huge trenches collapsing because they were 15 feet tall and full of mud, just clay. There were very few real deep sampling core samples taken. And with the shallow trenches that were made, even the 50 feet ones ran into nothing but junk conglomerates, andesite, basalt, different volcanic stones. What they call bedrock is probably only individual stones. We know about that in this area of Berkeley.

For example, if you got to the bottom of a creek and you decided to call an engineer and see if you can make your foundations, he may find a nice

place to put the foundation. You start putting it in two feet away and you hit a rock, so this is just messy stuff.

PH-16

And yet you want to talk about new instrumentation and a safe environment, paying no attention to the costs, that will be at least one-third higher if you are building in the hills in order to strengthen this and in the event of the earthquake, which is due in -- is overdue now, which will be something like 6.7. And this is admitted in your report. There will be great loss of taxpayer money and of life as landslides and buildings collapse on the buildings below. Thank you.

PH-16 cont.

MR. CHEKAL-BAIN: Thank you. Next will be Garniss Curtis and then John Shively.

MR. CURTIS: My name is Garniss Curtis. I am concerned about the danger of the Hayward fault with respect to the buildings on the hill, Lawrence Berkeley Lab, and people, students in the Foothill housing and Stern housing. The material on the hill is resting on soft material with large blocks of (inaudible) lava in it. And the contact on this side goes from the south end of the botanic garden in a curve back to the Cyclotron and around to Shasta Road closing up an (inaudible) circle that suggests a large crater.

PH-17

The blocks that we see in that, large blocks of andesite are standing on end. They clearly indicate that something collapsed into a big hole, probably a caldera. And then it filled with water so that sediments were deposited on top of this. But these blocks had different positions, left large voids which were filled with water and, in fact, Berkeley, in the early days got its water from these voids until they -- until the -- they used up all theirs.

So when Ben Leonard studied this with John Shively, they drew a (inaudible) in to see if they can tap one of these big things. And they did tap it. I was there when he was getting 400 gallons a minute from the side (inaudible), and then things collapsed.

So then they drilled a vertical hole, and they took out 14 to 16 million gallons of water in 10 years. This is water that is trapped between the fault blocks, this collapsed Calderas. And this is what most of the hill is built on. On the west side where the (inaudible) boundary comes around, the sediments of shale are dipping westward. They are rising at a centimeter per year, the same rate that the Hayward fault is moving. We are told the

PH-17 cont.

Hayward fault will have a 65 percent chance of a major earthquake in -- before 2032. And things are going to look very bad after that. Thank you.

MR. CHEKAL-BAIN: Thank you. So just a reminder, in 15 seconds I am going to put my hand up, and then I will tell you when your time is up in three minutes.

MS. SIHVOLA: Would you turn the volume up? I still can't hear.

MR. SHIVELY: I am John Shively. You are

going to give me credit here? When does time start?
MR. CHEKAL-BAIN: She hasn't started yet.
MR. SHIVELY: I am John Shively. I am an engineer. And I was an engineer -- I was a campus principle engineer in 1974 when I got a call from the Lab telling me that there was an major slide going on, and we needed to come address it because part of the slide was not on LBNL's property at that time. So I called the engineer, B.J. Leonard, the civil engineer, and he came and showed up, and we went up to the Lab. And at that time the slide over on the west side below Lawrence Hall of Science was very active, was sliding down, had broken the road inside LBNL. By the way, this is in the dry month of August 1974 when the sun was shining and

PH-17 cont.

PH-18

everything was beautiful.
At any rate, Dr. McMillan, who was the director of the Lab at that time, was out there, and he had all of these caterpillar tractors out to start pushing the earth away. And our consulting engineer, B.J. Leonard, called me aside. And I won't quote all the words he said, but he, in essence, told me they are crazy. They have got to stop. They are unloading it the wrong way. It is going to precipitate more.
It had already broken the road. It had

broken the underground utilities serving much of the Lab, and it had broken a building in two. It was a mess. And the Lab had retained -- I think it is O.C. Jones with a bunch of caterpillar tractors on the hillside. At any rate. I got that stopped because I noticed that the tractors were in violation of the OSHA roll-over protection. And finally the Lab apparently later retained Leonard himself who advised them on how to deal with it.

Nonetheless, this was just an indication of further instability of that hill. And it was not precipitated by an earthquake. It was precipitated by underground water that is coming from higher up over in Tilden. And I came up with the idea of

PH-18 cont.

intercepting the water with a -- well, up by the Space Sciences Lab, and it worked but -- apparently I am running out of time. My recommendation to the Lab -- and I am supported, by the way. Dr. Curtis is a professor emeritus, and he can speak to the issue of geology far better than I can. His recommendation is to stop any further development of the Lab, pack up your bags and move elsewhere. Thank you.

MR. CHEKAL-BAIN: Thank you. Now I have got Janice Thomas, and that is my last card. If anyone else is planning to speak, you need to fill out a card with Beverly.

PH-18 cont.

MS. THOMAS: Good evening. My name is Janice Thomas. And I want to say hello to Susan Samson. Hi there. Because as an advocate of science, I really want to join with you in encouraging this laboratory to move in a direction that will expedite research and promote efficiencies. UCSF has four campuses. They collaborate, they are efficient, they are effective, and they grew out of that. And when they realized that they had expanded beyond the site's capacity with pressure from the community and listening to the University, they found a better site. I applaud

PH-19

you guys with listening in respect to the general purpose lab. This room would have been packed to the rim had you all remained at that site.

But I want you, over all, to continue to really, really hear. You can see that there are concerns. The more we learn about the geological conditions, the more we will be sharing with you all, and the burden upon you will be greater to respond to that. And that is why, again, it was reaching out to the science advocate because, again, the landslide that Mr. Shively talked about and the caldera that Dr. Curtis talked about are real

PH-20

phenomena.

The people who have institutional memory are you, Jeff Philliber. The decision-makers, honestly, they come and go. As one of the old-school people here I have seen a lot of movement of leadership, of course. But the decision-makers aren't here. And so we are going to have to somehow communicate loudly enough and effectively enough to get movement to find a better place to grow this campus.

I know when 2025 comes around and this EIP comes out -- there will be a new one coming out -- I probably won't be participating in that one. But I keep thinking, is this the best place for the next

PH-20 cont.

hundred years of science? We are going to need science a hundred years from now, and we are investing in this place. So I just want you all to think about that. Thank you.

MR. CHEKAL-BAIN: Any other cards? These will be the last three. I will put your card in. So I have got -- the last four will be Carl Friberg, Lesley Emmington, Pam Sihvola, Carol Schemmerling, and Pam Sihvola will be the last four. So Carl Friberg and then Leslie Emmington.

MR. FRIBERG: My name is Carl Friberg. And I speak on behalf of the steering committee for

PH-21

BLUE, Berkeleyans for a Liveable University Environment. I don't know where to start on this. Basically no, no, no, no. The City of Berkeley, you know, or the University costs the City of Berkeley approximately $14 million a year beyond what the University contributes, something like that. The last thing we need in this city, not only is it the idea itself, to have more trucks come across our roads, driving through our neighborhoods and, you know, tearing up our city.

PH-21 cont.

People of Berkeley, the residents pay federal taxes, we pay state taxes, we pay city taxes and now we have to pay for all of the damage you and

the University does to our city. And now you want to ruin Strawberry Canyon more than it already is.

There is a lot of places that would welcome you with open arms, really, through the state, even nearby here. Your second alternative in your EIR would be perfect. Richmond needs the employment. It does not -- Berkeley does not. We are crowded.

PH-22

We can't park in our own neighborhoods on our block. Even though I have a permit, I have to drive around sometimes for 15 to 20 minutes to find a place to park.

The streets are terrible. They are chewed up. We have construction all over the University

PH-23

right now. You are going to be building on a place where there is landslides. You have to tear down buildings to put up new buildings probably for more people to be driving through our streets. I thought you had some planners up there, people with intelligence. It doesn't seem that way. I mean, I am upset that I have to take time out of my family evening to come down here and even say anything to this. Disgraceful.

PH-23 cont.

MR. CHEKAL-BAIN: Okay. Leslie Emmington and Carol Schemmerling.

MS. EMMINGTON: My name is Leslie Emmington,

and I live at 1955 The Uplands. And I am a member of Save Strawberry Canyon. And I wanted to respond to Dr. Gray because I know he is a gentleman undoubtedly of great integrity for his research -- your research, and you are excited about facilities that will make the research possible. And the kernel of your research is hope to bring health to problems we have in modern society.

PH-24

And Carl just mentioned the complexity or the questions of why this is the place. And there are so many themes here, but I think the main theme is the place and the health of the place and the instability of the place. And it's constricted.

And you are hoping to have synergy and growth. And one discovery might lead to another discovery. And this is a place that didn't develop naturally.

It developed because of World War II secret research. It is not a natural place to be. It is not a place where federal sustainability money should be used and applied. It is not part of the community. We understand this research is open to -- it is not secret. It is part of our greater community. And the millions and billions of dollars that are going into this research from federal stimulus money, perhaps, should be in a place like

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PH-24 cont.

Richmond.

There are so many things that have been said by people, but one thing I would like to emphasize again from today's New York Times is that that central feature of the front page was earthquakes. And we have been building buildings that are a threat to communities. They are in places they shouldn't be. There is earthquake faults running obviously, and this is just a place that is not healthy for LBNL as well as for the community.

So let's all get together. We don't need a CAG because that is talking about some future. We need to talk about right now, the crisis of right now, joining together and finding an alternative site that gives an advantage to you and a community profile to you that enhances your image and your improvement and your research. So let's do it differently. Thanks.

PH-24 cont.

MR. CHEKAL-BAIN: Thank you. So I have got Carol Schemmerling and Pam. Anyone want to speak a second time? Okay. If everyone wants to, what I want to do, to get going -- who wants to speak a second time? We can put two on the back. Pam, I am just going to let you go six minutes, if that works for you.

PH-25

MS. SIHVOLA: I would like you to turn up the volume. It is not just me.

MR. CHEKAL-BAIN: Okay. So Carol and then Pam.

MS. SCHEMMERLING: Once again, you guys, maybe we should televise this and have, you know, a sit com for the public to know what citizens in Berkeley go through periodically trying to let the University and the Lab know how we feel about what they are doing.

I happen to work at the Berkeley -- U.C. Berkeley's botanical garden when this happened, what Mr. Shively was talking about. Because there was so much water in those hills that during the worst drought we had had, the gardeners were embarrassed to be seen watering because they had so much water coming off the hill that they watered at night so nobody would see that they were using a huge amount of water in the garden. And that went on for a long time. That was a long drought. That water kept coming out.

It didn't seem to have much affect on anybody's sensibilities up at the Lab. Oh, well. We will just let it come out. All that wonderful water we could have been using elsewhere except that

PH-25 cont.

now most of the water that comes down that hill is not clean enough to use. And you have to understand that whatever is up there is going to come down to the Bay and through our houses and gardens and streets.

You have that nano-technology lab emitting nano-particles that you have no way of knowing the effect. What if there is an earthquake? What if there is a fire? You don't know what is going to happen. The Brits say if you inhale enough of it you suffocate. But you are just casual. Well, you know, science has to march on. And we are trying to keep up with it. It is so irresponsible.

You need to get out of there. You need to clean up the mess that you have made. You can take down those buildings and clean it up and restore it. My field is horticulture and we fix creeks. You have got to restore those hills. You cannot keep damaging them, ruining them for anything else. You have got that eucalyptus grove impregnated with tritium that you tried to sell to some Asian country until they got wise to it. I mean, what kind of people do things like that? You are pigs. You don't clean your place up. The stuff that's been going on up there is just crazy. You have got a lot

PH-25 cont.

of junk up there. You have got a lot of old stuff. Get rid of it all. Fix the hills. You have got that tritium plume coming down the Strawberry Creek. You have got to do something to clean up your mess.

And unfortunately, although people have advised you to go to Richmond, God save them if you go to Richmond because you are such slobs. You really don't know how to take care of things. But you are going to do great science. I am sorry. I am not impressed. I want you to get out of the canyon. I want you to restore the hillside, clean up your mess and go. Do science, if you have to, somewhere else. If you don't, I mean, we lived for many millenniums without your science.

MR. CHEKAL-BAIN: Pam Sihvola and then any

PH-26

other cards for a second time? Okay. We are going to do six minutes for her, and then after you will be Gene Bernardi.

MS. SIHVOLA: Good evening. My name is Pamela Sihvola with the Committee to Minimize Toxic Waste. For the past 15 years we have worked trying to understand and expose the historical contamination at the Lawrence Berkeley National Laboratory. In 1996, as Gene mentioned, we were desperately concerned about the construction of the

PH-26 cont.

replacement of the hazardous waste handling facility in a landslide area right on top of earthquake faults. Indeed, this is a map that shows the canyon. All these lines indicate fault lines. And the hazardous waste-handling facility is right here, right on top of the east canyon fault.

And then the General Purpose Lab was proposed to be placed right on top of the fault. These areas marked with the green indicate the historic legacy contamination of the Lawrence Berkeley National Laboratory. The Building 25 site that has been mentioned as a replacement area for the General Purpose Lab is in a landslide area, as we all learned from the EIR. And it is right smack in the middle of the largest plume within the old town. The old town is right here.

PH-27

And I have some questions about the demolition of the Old Town as well. There were five buildings in the notice of preparation for this particular EIR that were located in the Old Town, but suddenly they disappeared and went into a project called the demolition of the Old Town for which I understand nobody in the community knew anything about a negative declaration that was issued. So we are very concerned about what

PH-27 cont.

happened to those five buildings from the original plan and why, indeed, there was no environmental review for those particular documents.

Building 55 is up here. It is also part of another plume that is associated with this section of the Lab. And Building 71, all the trailers are in an area where contamination exists. In addition to the contamination, we have the earthquake fault. They are numerous and they all belong to the -- I mean, the whole Laboratory, the whole canyon belongs to the Hayward earthquake fault zone. And, indeed, I think initially all this should have been and may have been part of the (inaudible) zone which, indeed, has been modified at least 12 times since the past.

PH-28

PH-29

PH-30

The earthquake issue is a real concern.

This map here shows the major slide areas. Again, we have faults, we have creeks, and then we have the slides. This is the big one which is the main reason why the -- well, the hazardous waste-handling facility is now supposed to be retrofitted. This map -- these buildings are from the Lab's 2006 long-range development plan EIR. Everything in black indicates proposed buildings.

I don't know what, indeed, the Laboratory is

PH-30 cont.

planning to put, but this is a huge landslide area. Everything in black should never be materialized. I mean, it is sort of insane to even start retrofitting the hazardous waste-handling facility. I can't even imagine that the piers will be long enough. I mean, where are they going to be anchored? I mean, it is a huge slide, and I will bet you that -- I mean, I didn't see any real documentation that showed where there is stable ground where you can anchor anything.

PH-31

PH-32

They should go out of the canyon. Here is the Old Town. Again, everything in brown indicates slide areas. And this is -- I mean, you look at all these proposed buildings. They are in treacherous areas, and if they are not located in a chemical or radioactive contamination site they are in a landslide area that is specifically defined by the

PH-33

state of California as being an earthquake-induced landslide hazard zone which means landslide will be mobilized in the event of a major earthquake which we are expecting to happen any day now.

So please take this matter very seriously, review the real dangers of these particular proposals and, indeed, very seriously consider off-loading these buildings from the hillside.

PH-33 cont.

Thank you.

MR. CHEKAL-BAIN: Okay. Now we have got Gene Bernardi and then Janice Thomas.

MS. BERNARDI: I would like to correct my previous comments to say that the Lab ignored the east canyon fault when it cited the hazardous waste handling facility on a fault. So I was indicating the hanky-pank that the Lab went through in order to build the replacement hazardous waste-handling facility, and that they decided after the original EIR to build a non-nuclear facility originally. They were to build a Category Three non-reactor nuclear facility. That was what the original EIR said.

But the tritium focus group actually was able to get the Department of Energy to change the threshold for such a facility from 1,000 Curies to

PH-34

16,600 Curies in order to make it possible for them to not build a nuclear facility. That is despite the fact that there was a huge inventory, about 39,000 Curies of tritium, at the Lab at that time.

The other thing that they did was to move the fence-line a considerable distance from the existing fence-line around the hazardous waste-handing facility site in order to declare they

are not exceeding the regulations for radiation doses to the public. This would not be possible without public hearings if private property rather than UC Regents property were located outside the existing fence-line.

PH-34 cont.

Carol was talking about what slobs the people are at the Lab. And I just want to point out that all of this is done under the tutelage of the University of California. And I see some parallels here to what has been happening with the stadium. The judge in the case of the stadium said, "You can't have this barrier" -- I don't know whether it is a pier or what you would call it -- because it is attached to the stadium, and the (inaudible) will not allow it to be attached and to proceed. So someone just said we will do without this barrier that is supposed to prevent the stadium from collapsing in onto the recreation facility.

So now we see all of this hanky-pank that took place in order to do the hazardous waste handling facility, changing the fence-line so it did not exceed the doses to the public, building a non-nuclear facility instead of a nuclear facility, and now 50-foot deep piers that are attached to the building. Shouldn't the Federal Government be

PH-34 cont.

looking at the (inaudible) requirements?

MR. CHEKAL-BAIN: Next will be Janice Thomas and then Graniss Curtis, and the last speaker will be John Shively. Sorry. Janice Thomas and then Garniss Curtis.

MS. THOMAS: Yes. So each and every project that the Lab builds at the hillside campus increases our investment. And I say "our" since we are all taxpayers. It increases our investment in this mistake. So when I saw the presentation earlier and I saw these little shacks with these little buildings that were built in 1950 and they looked pretty bad, and I don't think they are really fit for anybody, especially the scientists and the research.

PH-35

So, yeah, demolish them. But you are, again, investing in the wrong site to be staying there. In other words, this should be the beginning of the end instead of more of the same and into the future. You said in your draft EIR that this new building, the general purpose lab, will allow some people to move from a leased off-site facility. I assume this is the Potter Street facility. Again, you have a nice facility with freeway access, and it is not all completely consolidated at one solitary

site. No, it is not. But, again, I challenge you to think about we should not be transporting -- we should not be, again, investing in this new site -- not the new site. But we should be considering staying at the Potter Street rather than the hillside. PH-35 cont.

When I see that you all are stabilizing the landslide area at the hazardous waste-handing facility, damn. I mean, this is a hazardous waste handling facility that was built on top of the east canyon fault. Is that what you said, Joan? I think I remember reading that in the draft EIR, you know, who did that. I don't like that. I don't think it was very good. I don't think it was very smart. So now, sure, you are going to stabilize it and you have to stabilize it. But doesn't this suggest that there is cumulative compound error, synergistic error? How about that one?

And I have got another one for you. If one PH-36 cumulative impact wasn't analyzed -- and, Jeff, did you know about this, that 10,000 trees will be removed and 45 acres in Strawberry Canyon? It is a reasonably-foreseeable planned project. It is a FEMA grant. And there is no -- it is not listed as a project and therefore there is no cumulative

PH-36 cont.

impact analysis.

MR. CHEKAL-BAIN: So we have got Garniss Curtis and Jennifer Mary Pearson and John Shively. And is that the last three.

MR. CURTIS: I just want to discuss the Hayward fault which extends from its contact with the San Andreas fault south of Gilroy and it goes on up and joins the Rogers Creek fault in Santa Rosa. Along this fault an interesting thing is happening. The serpentine is squeezing up like toothpaste carrying with it a lot of huge rocks. Stern Hall, the original Stern Hall and the extension of it sit on top of this melange, squeezed out of the Hayward fault. How fast it comes we don't know. But here is something we do know. When the tunnel was put in from the San Pablo Reservoir to the filter plan and to El Cerrito, three miles, when they got in over a thousand feet they bumped into serpentine at Thanksgiving. When they came back four days later

PH-37

that serpentine had squeezed out of the tunnel and they had to start all over. That stuff is synovial, and it carries with it these big rocks which are terribly dangerous, which, if it happens with this next quake here, Stern hall and Foothill housing will be destroyed.

PH-37 cont.

I also said that not because of the serpentine, but the earthquake itself is going to be as big as Loma Prieta, they say, or bigger. It will probably destroy the Richmond Bridge, which is very poor construction. Anyhow, if you want to see some of this, Tunnel Road has exposures of some of this material. And you can go along the Hayward fault as published by the U.S. Geological Survey and see this all along the fault material that has come up. Thank you.

MR. CHEKAL-BAIN: Jennifer and then John Shively.

UNIDENTIFIED SPEAKER: I thought John was next.

PH-38

MS. PEARSON: All right. Good evening, everybody. Can you hear me? Good. A few days ago there was an airplane flying very, very low, and I was very frightened. And I went out on Milvia between Cedar and Vine, I went down to look up at the Lab because I was afraid something might be going on with that airplane.

Well, probably the reason why -- I think it was a fighter airplane. I don't think it was a private plane. Probably the reason why I reacted so much was because I was born in the middle of Stern

Grove, World War II. And we had Nazi bombers. So whenever there is something like that, I go into kind of my war mode of being careful. So perhaps I preoccupy a little bit more about safety, but that was my experience. **PH-38 cont.**

Now, some years ago I worked for a county supervisor in Alameda County, and I had a colleague in the Oakland Police Department, and together we worked on an evaluation plan for the Oakland Coliseum. And this was in the mid 1970s when there was a lot of information about a certain variety of terrorism in those days, which in your literature you call intentional destructive acts.

Now, I usually don't say much about this because sometimes in the audience there are shaky people, and I don't want to up the ante. But I really think that this Lab is not very safe for the people that work there. I think the research is very important. I know people -- I have had people stay in my house who worked there, and I want to see it continue and to have more grants, but I would like it to be at an alternative site that has a safe perimeter.

My policeman friend who died always said it was a law enforcement nightmare up there. How could

law enforcement respond to intentional destructive acts. And I wonder if you do talk with our local law enforcement leaders, like what would they do.

I know there is disaster planing, and it is kept under wraps, and I know Homeland Security is also at the Lab, but I would like to really have you think about that because most of you work there. And I know that whenever I hear an airplane like that one or an explosion in Berkeley, I usually think something probably went on at the Lab by a crazy person or a danger person. And because there is no buffer zone, I don't know how you can patrol it. Three gates with key-pads, it is very, very easy to penetrate the Lab. It would be very easy for someone to knock down those western power towers.

PH-38 cont.

There are many things there that -- I am not a law enforcement person, but perhaps you could you look more carefully at that and consider an alternative site like the Golden Gateway Project at the Army Base in Oakland or the Richmond Field

PH-38 cont.

Station. Thank you.

MR. CHEKAL-BAIN: So John Shively is our last speaker.

MR. SHIVELY: Excuse me. Thank you. I am

PH-39

John Shively. Again, I just want to say briefly, an earthquake is now due, and earthquakes seem to happen in great cycles. And Dr. Curtis can speak to that much better than I can. And when it happened, it is going to have consequences for the Lab absolutely. The Lab is built on a very steep, precarious hillside, and I don't know the geology, but certainly Professor Curtis does.

And he has studied the full length of the Hayward fault. And he can give you a far better idea. But what I learned from Dr. Curtis is that when it does happen, certainly a lot of your facilities -- and the big investment that I know is up there because I worked up at the Lab back in the '60s for eight years except for two years I was in Switzerland. And then later I was working on the campus as a principal engineer in the Office of Architects and Engineers.

I know the -- those facilities are going to be damaged or destroyed, and when that happens, not only will you have facilities destroyed, you are going to have life damage and injuries or people killed. And I don't see how, based on what I have learned from Professor Curtis, I don't see how you can avoid it. But it does bring us to the point,

well, what are we going to do about it. Well, there are excellent alternatives, certainly.

The Richmond Field Station is, what, 20 minutes from the Lab. The campus is 10 minutes from the Lab. There is a bus that goes back and forth to the Field Station. The communication that is there is excellent. You got about 50 acres that can be developed. It is relatively flat. The LBNL report that alleges that it is on landfill is wrong. It is false.

I know we did a soil study, and I know what is out at the Field Station because later I was a manager of the Field Station for six years. So I think that this is a time when you should -- I know it is not something that people can take lightly, and I know you have got a tremendous investment in there. And I know that it is -- there is going to be a lot a lot of resistance to moving, but when facilities and lives are put in jeopardy, then you must honor that. Thank you.

PH-39 cont.

MR. CHEKAL-BAIN: Thank you very much. So this ends the public comment period. I am sorry.

PH-40

You have six minutes.

MS. SIHVOLA: We still have half an hour.

MR. CHEKAL-BAIN: Yeah. Go ahead.

MR. PHILLIBER: Let me just say one thing.

MS. SIHVOLA: I don't want to be so disrespectful to the audience.

MR. PHILLIBER: Let me say one thing. What is essential here is that we can hear and understand what you say. If you say here, here, and here, I can't really deal with those responses. I just want to let you know that so as you talk we can't really understand what you are saying, that we may have a difficulty in responding to your comments.

PH-40 cont.

MS. SIHVOLA: I will put it in writing. The date of Cal's February 22nd issue, "Berkeley Lab Reaps Benefits of Stimulus," this is -- this article states that, "Indeed, Lawrence Berkeley National Laboratory has received $264 million. Indeed, they have created 192 jobs." So if you calculate the basic value of each of these 192 jobs, it translates to $1.375 million per job.

I mean, that is kind of interesting, and especially if we think about these other issues where taxpayer monies are spent on retrofitting folly, which is the hazardous waste-handling facility, and building on now known landslides, I think this laboratory warrants an investigation and full audit by the GAO. And I hope that everybody

PH-40 cont.

here will join, and I think that we should ask the government accounting office to investigate how these ARRA funds are being spent. Under these American and Recovery Reinvestment Act monies, they should all be used in a way that is fully acceptable to the impacted community.

And then lastly I want to mention, I want to go back to the Old Town demolition, because this is very, very curious. On Page 4.0-6, you know, this is Chapter 6, Old Town demolition. And it says that, "The categorical exclusion was filed for the project under NEPA December of 2009 based on an environmental checklist completed in December 2009. This project was determined to be within the scope of LBNL's 2006 LIBB EIR. The project was approved in December 2009. Work is expected to commence in mid 2010 and be completed in mid 2013."

Who approved this project? Five of the buildings that were part of the original notice of preparation for this particular EIR are now dumped into the Old Town demolition without any public scrutiny, without any environmental review. I mean, were there any members of the public notified about

PH-41

the Old Town demolition? I certainly did not receive any notice regarding these categorical

PH-41 cont.

exclusions. I understand nobody here did either.

So I think the GAO should look into how the laboratory is moving with these huge amounts of taxpayer money. They are moving really fast, as fast as the landslides when they start moving. And I think we need to stop it until there is full scrutiny about using the monies appropriately. Thank you.

PH-42

UNIDENTIFIED SPEAKER: Just two small points. One of them is regarding Save Strawberry Canyon. I, as a citizen of Berkeley, was part of forming Save Strawberry Canyon, and Janice made a comment if the General Purpose Lab was still in Strawberry Canyon, this room would be full of people. And we mobilize around the beauty and the contribution that Strawberry Canyon makes to the greater Bay Area as part of its geological definition of what makes the National Seashore -- the consortium of all of our formations around the Bay.

And we are also now talking about Blackberry Canyon and Old Town. And it is a newcomer for me. And tonight I am learning about Old Town and

PH-43

Blackberry Canyon. But what I want to share is that as someone who is like everyone in this town,

probably, the Blackberry Canyon part of the Strawberry Canyon watershed is hidden to the eye. And even if you look at early pictures its ravine is hidden to the eye. It is part of the hill landscape, but it is hidden to the eye because the arroyo or the thickness of the steep slopes in which the Old Town exists were just thick with oak trees. And it is still not a vista point.

You don't -- people don't quite know where that Old Town is, where the Bevatron, where the electrical power is coming through. And I learned about it in depositions for the CRT case that Save Strawberry Canyon had -- there is an electric city in there that is just like if you were out in the Russian Steppes or something and you went into one of these cities that is just pulsating with -- I don't know, but I am not sure that it goes together with cancer research.

But anyway, the one other thing I want to say that is slides and the feeling of slides, I would like any of you to do what I did the other day during one of the rainstorms, which was to see the north fourth of Strawberry Creek, and if you find it where it comes down from Blackberry Canyon, you meet

PH-43 cont.

fences all around LBNL. And what is coming out from

PH-43

under the fences which are falling, tilting, old earth is coming down.

MR. CHEKAL-BAIN: So does anyone have any comments specific to the seismic Phase 2 EIR? Okay. Well, thank you very much. So public comment period is through March 15th. Here behind me is how you can contact us again. Beverly has information on the mailing address and the website where this presentation will be posted tomorrow morning. Any other things? Okay. Thank you. Have a very good evening and drive or AC Transit safely.

PH-44

(The meeting adjourned at 8:38 p.m.)

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REPORTER'S CERTIFICATE

I, Joanna Broadwell, Certified Shorthand Reporter No. 10959 in and for the State of California, hereby certify that the foregoing is a full, true and correct transcript of the proceedings to the best of my ability.

PH-44 cont.

Date:__________________ __________________________
Joanna Broadwell CSR # 10959

C. Master Responses

1. Master Response 1 – Geological Conditions Underlying the LBNL Main Hill Site

Many public comments on the Draft EIR state or suggest that no more buildings should be constructed at Lawrence Berkeley National Laboratory (LBNL) due to the unstable geological conditions of the main hill site. Comments largely reiterate or mirror the hypotheses put forward by University of California Berkeley (UCB) Professor Emeritus Garniss Curtis in an article published in the Berkeley Daily Planet in the autumn of 2008. This master response has been developed to address comments from the public regarding the geology of the main hill site and to correct factual errors and misrepresentations presented in those public comments.

In his 2008 article, Professor Emeritus Curtis argued that LBNL is underlain by two geologic structures of concern: 1) a volcanic caldera containing material with low strength, and 2) west-dipping Cretaceous strata sub-parallel to the slope above Foothill student housing. He alleged that the latter feature could cause the slope to fail during a major earthquake on the Hayward Fault and destroy all the buildings from the western margin of the LBNL main hill site to Doe Library on the UCB campus and beyond, a distance of over 1,000 feet west of Gayley Road. In January 2010, the organization Save Strawberry Canyon and one of its representatives sent a letter to UC LBNL, posted a video to the web featuring Professor Emeritus Curtis, and published a commentary in the Berkeley Daily Planet reiterating these concerns. The letter and video presented a geologic cross-section of the LBNL main hill campus, and the video also presented a geologic map of LBNL. These figures portrayed most of the LBNL main hill site as underlain by volcanic rock filling a caldera, portray this caldera fill as hundreds of feet thick, and indicate this fill is in direct contact with Cretaceous strata to the west. Public comments on the Seismic Phase 2 project Draft EIR make repeated reference to these submissions and to Professor Emeritus Curtis' hypotheses of 2008.

Figure 1 shows the most recent and comprehensive bedrock geology map of the entire LBNL main hill site, which was prepared by Parsons Engineering Science, Inc. (PES) and UC LBNL. This mapping data was drawn from hundreds of borings as well as from trenches, outcrops, construction excavations, and road cuts (PES and UC LBNL 2000). This map indicates that, contrary to the assertions by some commenters, volcanic rocks do not underlie most of the LBNL main hill site, but rather occur in various isolated to semi-isolated masses. Calculations from this map indicate that 46 acres of the 202-acre site, or 23 percent of the LBNL property, is underlain by volcanic rock, sedimentary rock intercalated with volcanic rock, and sedimentary rock including volcaniclastics. The majority of these 43 acres are currently not developed, and the LBNL 2006 Long Range Development Plan (LRDP) and EIR do not anticipate further development in these areas.

Figure 2 shows a geologic section through the LBNL main hill site from PES and UC LBNL (2000), again based on data from many years of borings, outcrops, road cuts and construction excavations. In particular, the thickness of all the volcanic rock masses is less than 100 feet. None of these masses is in contact with Cretaceous strata, but rather are underlain by the Tertiary Orinda Formation.

The theory that volcanic rocks at LBNL originated in an alleged caldera collapse alluded to by some commenters is not borne out in the geologic observations of the LBNL main hill site. Volcanic masses at LBNL do not contain the high proportion of tuff (consolidated volcanic ash) indicative of collapse synchronous with eruption that is a defining feature of collapsed calderas. Further, none of the breccias (coarse angular volcanic fragments) observed at LBNL exhibit the welding expected to occur in at least some of them had they been formed in a caldera coincident to eruption. In short, the geometry of the volcanic rock masses does not accord with a caldera collapse origin.

Some public comments characterize the volcanic rocks at LBNL as having little to no strength and are thus unsuitable to support structures. This is not consonant with the observation that these same materials underlie ridges and sidehill benches, and promontories, such as that occupied by the Lawrence Hall of Science. These geomorphic features indicate this material generally has higher strength and erosion resistance than the surrounding materials.[1]

Studies undertaken by PES and UC LBNL (2000), Fugro (2002), and Kleinfelder (2006) on the western slope of LBNL did not find west-dipping Cretaceous strata sub-parallel to the slope above Foothill student housing. These successive studies found these strata generally dip north between 20 and 50 degrees.

The mischaracterization of the attitude of these Cretaceous strata aside, the larger concern raised by public comments regards potential failure of this slope and damage to areas of the campus to the west during a strong-to-major earthquake (magnitude 6 to 8) on the Hayward Fault. The lack of terraces on this slope indicates it has risen over at least tens of thousands of years, during which time it is believed to have experienced hundreds of strong-to-major earthquakes on the Hayward Fault. Bedrock failure of this slope during any of these earthquakes would have deposited material derived from the Cretaceous strata at the toe of the slope, which is occupied by the Hayward Fault.

Fault and geotechnical investigations for Foothill Student Housing in this location did not encounter such landslide deposits. Rather, bedrock was encountered beneath a few feet of natural soils between two active strands of the

[1] This is corroborated by geotechnical studies demonstrating the strength of LBNL volcanic rock samples (comprehensive test results for the entire LBNL main hill site are not available; these results are based on a sampling of several years of such studies that covered a broad swath of the LBNL main hill site). High-blow counts recorded during sampling indicate that these underlying materials act more like rock than soil. These tests were conducted using a 2-inch diameter split spoon sampler driven with a 140-pound hammer dropped 30 inches. A wireline was used, as required, and samples were taken typically in excess of 50 blows per foot. Measurements from samples of these materials also indicate the breccias have an unconfined, undrained shear strength well in excess of 1,000 pounds per square foot, the threshold below which soils are considered "soft."

Hayward Fault, indicating no significant burial of this location by landslides. In addition, an inactive shear zone located generally along Gayley Road to the west (the "Louderback trace") was overlain by only a few feet of natural soil deposits. The last movement on this shear zone was at least 11,000 years ago, indicating that any landslide deposits in this location are at least that old.

Consequently the geologic record indicates the western slope of LBNL is stable with regard to potential bedrock landslides impinging on areas beyond the toe of the slope posited in the public comments.

The potential for landslides in the Berkeley Hills exists whether or not the University maintains a campus on the main LBNL hill site. UCLBNL development now and in the future provides the impetus for identifying and mitigating potential slope stability issues.

2. Master Response 2 – Security Issues

Several comments from one individual were received concerning site security; most of these pertain not to the proposed project but to the LBNL main hill site in general and to off-site locations. These comments focus particularly on the potential for occurrence of criminal activities, intentionally destructive acts, and/or terrorist activities at LBNL. Some of the comments were inquiries as to UC LBNL's and the Richmond Field Station's standing on a Department of Homeland Security "List." One comment asks for the current "potential projection for intentional destructive acts" at LBNL. Several comments from this individual suppose that LBNL could be a vulnerable to intentionally destructive acts due to its profile, existing security systems, and from the commenter's characterization of a proliferation of televised dramas and in video games that provide "blueprints" for destruction of laboratories and government facilities. The commenter asks whether LBNL would not be safer by moving its facilities and operations to a remote site with a large security perimeter.

The majority of these comments and inquiries are pertinent neither to the adequacy of the EIR analysis nor to the Seismic Phase 2 project itself. General questions about LBNL site-wide security and speculation about LBNL as a terrorist target are beyond the scope of this project-specific CEQA analysis. Nevertheless, the following discussion is intended to address the commenter's concerns and inquiries.

The proposed project scoping process took place from December 9, 2008 to January 27, 2009 and included a public scoping meeting on January 14, 2009. During that scoping process – and since that time – no specific information or concerns regarding potential terrorist or criminal acts directed at the project in particular or the UC LBNL in general have been identified. Following CEQA and University of California guidance and significance criteria, the Seismic Phase 2 Draft EIR examined security-related issues (Section IV.11, Public Services) and hazards (Section IV.7, Hazards and Hazardous Materials). The report concluded that no significant impact is reasonably expected to occur either in the area of hazards or in the delivery of site security and police services. This applies both at the project level and at a cumulative level.

The University is not aware of a particular "Homeland Security list" that ranks the LBNL main hill site and/or the Richmond Field Station. The Department of Homeland Security does maintain lists that categorize certain individuals for security purposes, but these appear to be different from what the commenter has requested. It therefore is unclear to the UC what information the commenter is seeking, nor does it seem to be information pertinent to the scope of the Seismic Phase 2 EIR.

A projection about the potential for "intentionally destructive acts" at LBNL would be speculative and also outside the scope of the Seismic Phase 2 EIR. At this time, the UC is aware of no known terrorist or organized threats to commit destructive acts against LBNL of the type alluded to by the commenter.

D. Responses to Comments

Responses to written comments received during the public review period and oral comments made at the February 25, 2010 public hearing are summarized in the matrix below.

RESPONSE TO COMMENTS MATRIX

Comment ID	Comment	Response
EBMUD-1	East Bay Municipal Utility District (EBMUD) appreciates the opportunity to comment on the Draft Environmental Impact Report (EIR) for the Seismic Phase 2 Project located at the Lawrence Berkeley National Laboratory (LBNL) in the Oakland-Berkeley Hills area. EBMUD has the following comments.	The comment thanks LBNL for the opportunity to comment on the DEIR. No further response is necessary.
EBMUD-2	On page 4.13-11, first paragraph under 4. Domestic and Fire Water Supply, EBMUD's Berkeley View Reservoir capacity should be revised to 1 million gallon.	The DEIR text will be revised as follows: "There are two water lines into LBNL from the outside, including a 12-inch diameter pipeline originating at EBMUD's Shasta Reservoir (2-million gallon capacity) and a 6-inch diameter pipeline originating at EBMUD's Berkeley View Reservoir (~~3~~1-million gallon capacity)." Please see Chapter 3 of the Final EIR.
EBMUD-3	On page 4.13-11, first paragraph under 4. Domestic and Fire Water Supply, please provide a reference on how the 5,000 gallons per minute flow capacity was determined.	The DEIR text will be amended to include the following footnote on page 4.13-11: "LBNL, 2006, Long-Range Development Plan Environmental Impact Report, page IV.M-2." The footnote directs the reader to the page in the 2006 LRDP Final EIR where estimated flow rate is explained. Please see Chapter 3 of the Final EIR.
EBMUD-4	EBMUD's Shasta and Berkeley View pressure zones currently serve the existing LBNL facilities. If additional water service is needed, the project sponsor should contact EBMUD's New Business Office and request a water service estimate to determine costs and conditions for providing additional water service to the existing parcels. Engineering and installation of water services requires substantial lead-time, which should be provided for in the project sponsor's development schedule.	The project would not exceed existing Water Supply Assessment agreements with EBMUD. The University agrees to contact EBMUD should additional water provision be needed by this project at a later time.
EBMUD-5	Please be aware that several regulatory changes have taken place since EBMUD provided comments to the Notice Of Preparation of the EIR for the project. EBMUD's Main Wastewater Treatment Plant (MWWTP) and interceptor system are anticipated to have adequate dry weather capacity to treat the proposed wastewater flows from this project, provided that the project and the wastewater generated by the project meet the requirements of the current EBMUD Wastewater Control Ordinance. However, wet weather flows are a concern. EBMUD has historically operated three Wet Weather Facilities to provide treatment for high wet weather flows that exceed the treatment capacity of the MWWTP.	On September 30, 2009, LBNL issued a Sanitary Sewer System Management Plan (SSSMP) which guides the Facilities Division and the Environmental Health and Safety Division of LBNL in identifying, prioritizing, and continuously renewing and replacing sewer system facilities so as to maintain reliable service, and in cost-effectively minimizing infiltration and inflow. As described in the SSSMP, UC LBNL has established procedures for monitoring and evaluating infiltration and inflow (I/I), including guidelines for taking action to limit I/I. Groundwater infiltration and inflow (GWI/I) and rain-dependent infiltration and inflow (RDI/I) are quantified and monitored to ensure that the hydraulic capacity of the sanitary sewer collection system is not

Comment ID	Comment	Response
	On January 14, 2009, due to Environmental Protection Agency's (EPA) and the State Water Resources Control Board's (SWRCB) re-interpretation of applicable law, the Regional Water Quality Control Board (RWQCB) issued an order prohibiting further discharges from EBMUD's Wet Weather Facilities. Additionally, on July 22, 2009 a Stipulated Order for Preliminary Relief issued by EPA, the SWRCB, and RWQCB became effective. This order requires EBMUD to begin work that will identify problem infiltration/inflow areas, begin to reduce infiltration/inflow through private sewer lateral improvements, and lay the groundwork for future efforts to eliminate discharges from the Wet Weather Facilities. Currently, there is insufficient information to forecast how these changes will impact allowable wet weather flows in the individual collection system subbasins contributing to the EBMUD wastewater system, including the subbasin in which the proposed project is located. As required by the Stipulated Order, EBMUD is conducting extensive flow monitoring and hydraulic modeling to determine the level of flow reductions that will be needed in order to comply with the new zero-discharge requirement at the Wet Weather Facilities. If is reasonable to assume that a new regional wet weather flow allocation process may occur in the East Bay, but the schedule for implementation of any new flow allocations has not yet been determined. In the meantime, it would be prudent for the lead agency to require the project applicant to incorporate the following measures into the proposed project: (1) replace or rehabilitate any existing sanitary sewer collection systems, including sewer lateral lines, to reduce infiltration/inflow and (2) ensure any new wastewater collection systems, including sewer lateral lines, for the project are constructed to prevent infiltration/inflow to the maximum extent feasible. Please include such provisions in the environmental documentation and other appropriate approvals for this project. If you have any questions concerning this response, please contact David J. Rehnstrom, Senior Civil Engineer, Water Service Planning at (510) 287-1365.	exceeded and to determine if I/I reduction projects should be initiated. UC LBNL also maintains design and construction standards, specifications, and details which ensure that new and rehabilitated sanitary sewer collection system infrastructure is designed and installed in compliance with the latest federal and State regulations, and in line with general industry standards. The SSSMP contains a framework for implementing the recommendations made by EBMUD in view of the January 14, 2009 RWQCB order. When EBMUD has determined new flow allocation requirements and the schedule for implementation, the SSSMP will allow UC LBNL to react as necessary. Additionally, stormwater control measures described on pages 4.8-5 through 4.8-8 of the Draft EIR will further reduce wet weather flows in the individual collection system subbasins contributing to the EBMUD wastewater system. The Draft EIR has been revised to include a discussion of the SSSMP, as shown in Chapter 3 of this Final EIR.

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Comment ID	Comment	Response
CMTW-1	The [subject] Project consists of the demolition of Buildings 25, 25B and 55, six modular trailers associated with Building 71, the construction of an approximately 43,000 gross square foot General Purpose Laboratory (GPL), and the seismic strengthening of the Building 85 complex - LBNL's Hazardous Waste Handling, Treatment and Storage Facility, all located in the Strawberry Creek Watershed's Strawberry and Blackberry Canyons. Our comments are provided in two (2) parts. Since all the project components (areas associated with B85 complex, B25 and B71) are located site-wide at LBNL, in areas of great concern to the community, i.e. on top of earthquake faults, active landslides, radioactive and chemical contamination plumes (both soil and groundwater), creeks and networks of creeks etc., Part 1 of our comment letter is titled: Contaminant Plumes of the Lawrence Berkeley National Laboratory and their Interrelation to Faults, Landslides, and Streams in Strawberry Canyon, Berkeley and Oakland, California, and cover our concerns in the following areas evaluated in the DEIR: Biological Resources, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Transportation and Traffic, Utilities and Service Systems - and we ask that you respond to our concerns in a comprehensive and serious manner.	The location of the project is described in Chapter 3 of the Draft EIR, and Figure 4.8-1 of the Draft EIR shows a delineation of Strawberry Canyon Watershed and Blackberry Canyon Watershed. The comment is noted. No further response is needed.
CMTW-2	Part 2 of our comment letter on DEIR consists of all the comments we provided on the Notice of Preparation (NOP) of the above referenced document, as these comments and concerns were largely ignored in the preparation of DEIR .The only changes that occurred between the NOP and the NOA (Notice of Availability) of the DEIR related to the demolition of several buildings and structures in the Old Town area, i.e. Buildings 4, 5, 14, 16, and 17, possibly some of the most contaminated buildings at LBNL, and Building 74F in the East Canyon, which were all removed from the EIR process, escaped all public and agency comment as they were secretly included into the Old Town Demolition Project, ... for which a Categorical Exclusion under NEPA was filed in December 2009, without any notice to the public. Please, explain why?	Please refer to response to Comment PH-41.

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Comment ID	Comment	Response
CMTW-3	We also ask that a full blown EIS under NEPA be prepared for the Old Town Demolition project.	The comment is noted. The Department of Energy is the federal decision-maker for NEPA issues concerning the Old Town demolition project.
CMTW-4	Every single structure evaluated in the DEIR is located in a landslide area, as officially defined by the State of California, as being in an Earthquake Induced Landslide Hazard Zone, i.e. landslides will be mobilized in the event of a major earthquake - expected to happen any day now on the active Hayward Fault! (See attachment 1).	For a discussion of earthquake induced landslide hazards, please see pages 4.5-19 through 4.5-22 of the Draft EIR and Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
CMTW-5	Furthermore all the components of this Project are located in areas of LBNL where legacy chemical and radioactive contamination is present in the soil and groundwater, due to operations during the last 70 years, which the DEIR failed to describe in the kind of detail that the site and its history warrants!	As directed by CEQA, Section 15125, the DEIR must include a description of the physical environmental conditions in the vicinity of the project as they exist at the time the notice of preparation is published, so as to establish a baseline for determining whether an impact is significant. The description shall be no longer than is necessary to an understanding of the significant effects of the proposed project and its alternatives. Pages 4.7-17 through 4.7-22 of the DEIR provide a description of the presence of chemical and radioactive contamination in relation to the project sites, as well as a description of the processes by which these issues have been addressed in the past, are currently addressed, and would be addressed in the event that contaminants are disclosed during the site demolition process.
CMTW-6	The DEIR is deficient, inadequate, misleading and in sections erroneous. For instance a claim is made that the new proposed location of the GPL is not located in Strawberry Canyon, when indeed Figure 4.8-1 of the DEIR shows the Strawberry Creek Watershed divisions into Blackberry Canyon and Strawberry Canyon, indicating clearly that the entire Building 25 site, the proposed location of the GPL, is in Strawberry Canyon, in the middle of the Building 25 slide and Building 25A Lobe of the Old Town Groundwater Solvent (VOC) Plume! (See attachment 2, A and B)	Please see the delineation of the Strawberry Canyon Watershed and the Blackberry Canyon Watershed in Figure 4.8-1 of the Draft EIR. Building 25/25B and Building 85/85A are located in the Strawberry Canyon Watershed, however, Building 55 and Building 71 trailers are not. The Draft EIR has been revised to clarify the location of project components, as shown in Chapter 3 of this Final EIR. Regarding groundwater contamination at the LBNL main hill site, please see response to Comment CMTW-5 and pages 4.7-17 through 4.7-22 of the Draft EIR.

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CMTW-7	In conclusion, LBNL, DC and the Department of Energy (DOE) continue to willfully ignore and exclude the most significant, fundamental facts related to the Lab site, i.e. the unconsolidated nature of the volcanic rocks, mud and water that fill an old crater, a collapsed caldera, on which LBNL facilities were built starting in 1940!	Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site, and responses to Comments PH-17, GC-5, GC-10, GC-11, GC-12, GC-14, GC-17, GC-24, and GC-27.
CMTW-8	What is the use of drilling 35-50 foot deep holes for piers into this unconsolidated melange of volcanic fragmental debris, without ever reaching bedrock, to attempt to tieback the Lab's Hazardous and Radioactive Waste Treatment and Storage Facility (B85 complex), further wasting taxpayer funds!	As discussed in responses to Comments PH-15, PH-32, PH-35, all of the pier holes will extend into in-place bedrock. Regarding Geology and Soils, please also refer to Ch. 4.5 of the Draft EIR and Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
CMTW-9	The landslide on which the Hazardous Waste Handling Facility (HWHF) was built is over 2200 feet (7+ football fields) long, between the East Canyon Fault (with its numerous springs already identified by UC in 1875) and the Wildcat Fault.(See attachment 3, A and B).	Attachment 3 is from the "Initial Landslide Characterization Study, East Canyon – Buildings 85 and 85A" by Alan Kropp & Associates (AKA), which is dated July 31, 2006. This report and the referenced figure are superseded by the "design-level" geotechnical investigation report for the Building 85 seismic strengthening project, which is dated April 2, 2010. The design-level report includes onsite geologic data that was not available in 2006, much of which was obtained through geologic explorations conducted in 2009. These data were obtained through borings, test pits, and an exploratory rock cut, all of which were performed to resolve geologic ambiguities that remained at the end of the previous "initial" landslide characterization study. As a result of this additional work, we now have a better understanding of the geologic conditions within the East Canyon and, specifically, in the area of the HWHF. Notably, the work performed in 2009 included drilling four borings in the upper and lower yards of the HWHF as well as three borings and three test pits in the vicinity of the old quarry downslope and southeast of the HWHF. A new Site Geologic Map (Figure 9) is presented in the April 2, 2010 design-level report that supersedes the previous "initial" geologic map of Attachment 3. The 2010 Site Geologic Map differs from the 2006 geologic map in the following ways: • The large masses of landslide deposits that occupy much of the floor of the East Canyon do NOT underlie the HWHF buildings (Buildings 85 and 85A), or the quarry southeast of the HWHF. The landslide deposit mapped as Qls-1 on Figure 9 of the April 2, 2010 report is therefore

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		smaller (about 1100 feet long by 300 feet wide) and is oriented such that sliding would cause it to slide past or move away from the planned below-grade seismic strengthening elements located east of the HWHF buildings. • Much smaller masses of landslide deposits exist beneath the HWHF buildings that generally trend northwest-southeast, the direction of maximum slope coming off of the ridge that flanks the western side of the East Canyon. These landslide deposits mapped as Qls-3 and Qls-4 on Figure 9 of the April 2, 2010 report are about 15 and 20 feet, respectively. It is these smaller landslides that would be retained by the planned below-grade seismic strengthening elements located east of the HWHF buildings. The East Canyon fault, Wildcat fault, and the historic springs shown on the referenced 1875 map (Attachment 3B) are shown on the geologic maps presented in both the "initial" (2006) and design-level (2010) reports. In 2008, William Lettis & Associates (WLA) excavated a continuous exploratory trench south and southwest of the HWHF that demonstrated that the East Canyon fault does not exist, as mapped. Also in 2008, WLA excavated exploratory trenches on the opposite side of the East Canyon (southeast of Building 74) that showed the Wildcat fault is not Holocene-active (i.e. active within about the last 11,000 years). The springs shown on the 1875 map exist near the depositional contact between the more permeable Moraga Formation volcanic rocks and the underlying less permeable rocks of the Orinda formation. This location provides a reasonable explanation for the alignment of these natural springs. In summary, the East Canyon fault, Wildcat fault, and springs referred to by the commenter have been investigated, considered, and accounted for in the design of the proposed seismic strengthening project.
CMTW-10	The same danger is present at the B71 and B25 sites, as both are on top of active landslides (See attachment 1).	The referenced figure shows hypothesized "paleolandslides" and not "active landslides," as they are referred to by the commenter. Recent trenching near Building 25/25B exposed volcanic rock in depositional contact with underlying older sedimentary rock and not the volcanic paleolandslide body shown on the attachment referenced by the commenter. Geologic review and analysis shows that the Building 25/25B (GPL) site has been geologically stable for thousands of years as indicated on page 4.5-20 of the Draft EIR.

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CMTW-11	We therefore ask that LBNL/DOE/UC immediately issue a site-wide MORATORIUM to any new construction and immediately assemble an international, worldclass, independent group of geotechnical experts to perform all-encompassing, site-wide geological investigations and excavations regarding faulting, geology and landslides in the Strawberry and Blackberry Canyons, and that these experts be paid by some of the $ 264 million of ARRA (American Recovery and Reinvestment Act) funds, already received by LBNL! (See attachment 4, A and B)	The comment is noted.
CMTW-12	We also ask that at the same time, during the moratorium, a comprehensive Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) be prepared for this Project!	The comment is noted. The Department of Energy is the federal Lead Agency and decision maker for NEPA issues concerning the Seismic Phase 2 Project.
CMTW-13	Attachment 1: LBNL Geologic Map from the RFI (Parsons, 2000) Report	The comment is noted.
CMTW-14	Attachment 1A: Wright, George. January 28-February 3, 2010. The Volcano Beneath. The Berkeley Daily Planet. pp 1, 26.	The comment is noted. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
CMTW-15	Attachment 2A: Lawrence Berkeley National Laboratory, Seismic Phase 2 Project EIR. Storm Water Pollution Prevention Plan. Attachment 2B: Site Environmental Report for 1997. Section 5.6. E. Stormwater.	The comment is a photocopy of Figure 4.8-1 from the DEIR showing the proposed GPL located in the Strawberry Canyon Watershed. The comment is noted. Please see response to Comment CMTW-6. The comment is a photocopy from the 1997 Site Environmental Review which includes the source map for Figure 4.8-1 from the DEIR showing the boundaries of the Strawberry Canyon and Blackberry Canyon Watersheds. The photocopy includes an underlined passage explaining the subdivision of the Strawberry Creek Watershed into the Strawberry Canyon and Blackberry Canyon Watersheds. The comment is noted. Please see response to Comment CMTW-6.
CMTW-16	Attachment 3A: Geological Map of the East Canyon Area. Attachment 3B: Map of Strawberry Valley and Vicinity.	The comment is noted.
CMTW-17	Attachment 4A: Marcaret, Cristian. Tuesday, February 2, 2010. Berkeley Lab Reaps Benefits of Stimulus. The Daily Californian.	The comment is noted.

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	Attachment 4B: Chen, Christine. Monday, March 3, 2010. Lawrence Berkeley Lab Gains Federal Funds. The Daily Californian.	
CMTW-18	Since 1940, land use and planning at LBNL has been sporadic, haphazard, initially due to the secret nature of the Manhattan Project and later, during the cold war, the culture of secrecy continued under the Atomic Energy Commission and Department of Energy. If indeed UC considers this site to be a viable Hill Campus - now is the time to finally determine that fact, ...	Issues related to the long term planning and development of LBNL at the LBNL main hill site are identified in the 2006 Long Range Development Plan (LRDP).
CMTW-19	... and if the unconsolidated soils of the collapsed caldera are deemed unsuitable for future development, it is critical that no more taxpayer funds be wasted into this landsliding, fault fractured sinkhole, but instead in the future of a new LBNL, campus in Richmond or Oakland!	The comment is noted. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
CMTW-20	What is the total estimated cost of the Project? Please list projected costs per each Project component.	This comment does not raise an environmental issue, and no response is required.
CMTW-21	How much of the Project is funded by LBNL's $ 264 million ARRA funds? Please list ARRA funded portions, in dollar ($) amounts per each Project component.	This comment does not raise an environmental issue, and no response is required.
CMTW-22	Attachment: Collins, Laurel, Geomorphologist. Contaminant Plumes of the Lawrence Berkeley Laboratory and Their interrelation to Faults, Landslides, and Streams in Strawberry Canyon, Berkeley and Oakland, California. [refer to attachment for full text]	The comment, as well as the reference supplied by the commenter, is noted. The Seismic Phase 2 EIR includes analysis of potential hazards and hazardous materials (Section 4.7), geologic conditions and soils (Section 4.5), and water issues (Section 4.8). These analyses are based on recent as well as long-term investigations, and include results from geotechnical borings and other sampling methods, by independent, qualified geotechnical experts, other independent environmental scientists and consultants, and LBNL Environmental Health and Safety specialists. The Draft EIR analysis has identified its methodology for these analyses and has produced the reports prepared to support the EIR analyses referenced herein. The extents of groundwater contamination plumes at the LBNL main hill site have been determined using information collected from more than 300 wells. Based on this information, which is available both on line and in the public library, none of these plumes extends beyond the LBNL site boundary. Extensive cleanup efforts carried out at LBNL during the last decade have reduced the contamination level in groundwater several orders of magnitude. In

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		fact, at this time the quality of groundwater in one of the plumes is very close to the drinking water standard. LBNL Environmental Restoration Program's Quarterly Progress Reports are available online at: http://www.lbl.gov/ehs/erp/html/documents.shtml.
CMTW-23	Comments on the Notice of Preparation (NOP)/Environmental Impact Report (EIR) under CEQA and Environmental Assessment (EA) under NEPA for Seismic Life Safety Phase 2B Project at the Lawrence Berkeley National Laboratory. Again - another proposed project, this time with at least 17 (seventeen) individual components, in the treacherous Strawberry Canyon Caldera, the location of the Lawrence Berkeley National Laboratory (LBNL). It will be impossible to adequately analyze the environmental impacts of these 17 individual projects in one EIR/EA as proposed. At minimum we ask that the project be severed to its 5 major geographical components, as described in Figure 3 of the NOP's project information section, and that 5 separate, individual, EIR/EA/EIS reports be prepared, for the reasons stated below.	The five components of the proposed project are evaluated in a single EIR because they all address seismic strengthening and are therefore related.
CMTW-24	The entire LBNL campus is situated in the HAYWARD EARTHQUAKE FAULT IMPACT ZONE (HEQFIZ), as seen in the 1992 USGS map (page 2), sandwiched between the Hayward Fault and the Wildcat Fault. The inadvisability of any development/any new development in the Strawberry Canyon Caldera is very soberly described by UC Berkeley's Garniss H. Curtis, Professor Emeritus, Department of Earth and Planetary Science in his May 11, 2008 comment letter (pages 3-5). We ask that all these concerns be addressed in the EIR/EA/EIS reports' Geology and Soils section. It appears that, since the collapsed caldera is filled with unstable landslide materials, a major earthquake along the Hayward Fault will have Potentially Significant Impacts, that cannot be mitigated by anything other than not building in the canyon, i.e. a complete moratorium on new construction at LBNL and a gradual off-loading of facilities from the Hill to safer areas. We	The Draft EIR Geology and Soils section (Section 4.5) analyzes geotechnical issues of constructing the proposed GPL. Please also see the Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

Comment ID	Comment	Response
	ask that this scenario be included in the scope of the EIR/EIS.	
CMTW-25	Figure 11-20. Map Showing Alquist Priolo Zones and Wildcat Fault. Lawrence Berkeley Laboratory.	The comment is noted. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
CMTW-26	Statement of Garniss H. Curtis, Professor Emeritus, Department of Earth and Planetary Science, U.C. Berkeley. May 11, 2009. [refer to statement for full text]	The comment is noted. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
CMTW-27	LBNL is a nuclear-industrial complex and many of the 14 structures proposed for demolition have been potentially used for work involving radioactive and hazardous materials and are potentially located on contaminated soil and on top of known radioactive and hazardous waste contamination plumes. The NOP document referred to these 14 structures as trailers, labs and shops without any specifics as to their past use. LBNL's Site Environmental Reports provide the following names and descriptions: Buildings 25 Mechanical Technology/Engineering Shop 25B Waste Treatment Facility 55 Research Medicine/Radiation Biophysics (74 Research Medicine/Radiation Biophysics, Cell&Molecular Biology Laboratory) 74F Housing for animals used for research at facility above 4 Magnetic Fusion Energy (MFE)/ALS Support Facility 5 Magnetic Fusion Energy (MFE)/Accelerator and Fusion Research 14 Accelerator&Fusion Research&Earth Sciences 16 Magnetic Fusion Energy Laboratory/Accelerator and Fusion Research Laboratory 17 EH&S/Applied Sciences Lab (71 Heavy Ion Linear Accelerator (HILAC/Center for Beam Physics, Ion Beam Technology) 71 C, D, F, H, J, P B-Factory associated with facility above LBNL operates facilities which contain Radioactive Material Areas (RMAs) that are subject to radioactive air emissions regulations of NESHAPs (National Emission Standard for Hazardous Airborne Pollutants) and have the pontential to emit radionuclides into the atmosphere. Building 55 has at least 9 such sources.	LBNL is a non-nuclear facility. The Seismic Phase 2 project will demolish Buildings 25/25B, 55, and the Building 71 trailers. Specific histories of each of the buildings proposed for demolition, and descriptions of any hazards expected to be found therein, are included in the Draft EIR, particularly in Chapter 3, Project Description; on pages 4.4-8 through 4.4-10 (Cultural Resources Section); and in the discussion of impacts in Section 4.7 (Hazards and Hazardous Materials). There are eight locations (not nine) in Building 55 where researchers are authorized to use radioactive materials, as reported in the "Radionuclide Air Emission Report for 2008" (available online at http://www.lbl.gov/ehs/esg/Reports/tableforreports.shtml). This number stayed the same in 2009. These annual reports are available online going back 10 years to 1998 and provide information on all locations where radioactive materials have been used during that time. The Draft EIR is a stand-alone CEQA document and is not paired with a NEPA document (i.e., it is not an EIR/EIS). Draft Section 4.7 (pages 4.7-16 and 17) describes in overview the history and uses of the buildings proposed for demolition, and the types of hazards and wastes expected in those facilities. Pages 4.7-17 through 4.7-22 describes subsurface contamination known to exist from or around those facilities. SP2 Impact HAZ-2 (pages 4.7-25 through 4.7-32) discloses and describes the results of surveys to identify hazardous materials in the buildings proposed for demolition. In addition, the Draft EIR identifies that "to address the hazardous materials issues identified during the survey as well as other safety issues, a Hazardous Analysis Report (HAR) was prepared for the proposed project in 2009." This HAR is refer-

Comment ID	Comment	Response
	We ask that the Hazards and Hazardous Materials sections of the EIR/EIS address/describe in detail the history of the uses of all the 14 buildings proposed for demolition and list all the equipment and radioactive/hazardous materials used at these structures and the various kinds of wastes generated there during their lifetime. This will help to better assess the degree of contamination associated with each of the structures, lab equipment, waste water/ sewer lines, sumps etc. Especially, as you know, almost 3 pounds of mercury was recently found in a Building 71Q storm drain sump, (pages 7-8) estimated to have been there from 10 to 40 years.	enced in the Draft EIR and is made available as part of the public record for this project.
CMTW-28	Attachment: CAT OE-Operational Emergencies, B71 Occurrence Report, discovery date 9/25/05. [refer to report for full text]	The commenter's materials have been received and reviewed. Because they do not address the adequacy of the EIR, no further response is warranted.
CMTW-29	To further illuminate our concerns we are enclosing a copy of CMTW's March 2007 Report titled: <u>Contaminant Plumes of the Lawrence Berkeley National Laboratory and their Interrelation to Faults, Landslides, and Streams in Strawberry Canyon, Berkeley and Oakland, California</u> (as a CD). We specifically ask you to review sections on CONTAMINANT SITES (Chemical and Hazardous Contamination and Radioactive Contamination), DRAINAGE NETWORK MAPPING, FAULT MAPPING,LANDSLIDE MAPPING, ZONES OF CONCERN FOR POTENTIAL PLUME MIGRATION and FUTURE DEVELOPMENT AND SITE CONDITIONS.	UC LBNL has reviewed the commenter's supplementary materials. The Draft EIR has addressed contamination and plumes (Section 4.7), drainage (Section 4.8), and seismic and soils issues (Section 4.5). "Site conditions" are identified and addressed throughout the entire Environmental Evaluation chapter (Section 4). Future development is addressed in the Draft EIR cumulative impacts discussion (Section 4.D and throughout each of the environmental resource discussion areas, and in the Lab's 2006 Long Range Development Plan (LRDP) and LRDP EIR. Please also refer to Master Response 1, Geological Conditions Underlying the LBNL main hill site.
CMTW-30	<u>Figure 2</u>. in our Report (page 10) shows a significant VOC (Volatile Organic Compound) groundwater plume associated with B 71 and its "trailer" area, surrounded by a radioactive tritium <u>soil</u> plume. In the "Old Town" area buildings 4, 5, 14, 16 and 17 are all located on top of the huge Old Town VOC groundwater solvent plume.	Concentrations of VOCs are well below the drinking water standard under B71 and its trailer area. UC LBNL disagrees that a radioactive tritium soil plume is present in the B71 area or that the Building 74 diesel plume is migrating. Please see pages 4.7-16 to 4.7-17 of the Draft EIR regarding the current use and management of hazardous materials at the Project Site. Quarterly reports prepared by the UC LBNL Environmental Restoration Program and

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	In the East Canyon the B 74 Diesel plume is migrating into the area of the proposed General Purpose Lab.	submitted to the Department of Toxic Substances Control confirm this conclusion. Please see page 4.7-28 of the Draft EIR.
CMTW-31	Figure 18 a. shows the Zones of Concern at LBNL for Groundwater Plume Expansion along Faults, Bedrock contacts, Landslides, Historic and Modern Creeks. Please note and address in the EIR/EIS that all 5 areas of the proposed "Seimic Life Safety Phase 2B Project" are impacted by migrating groundwater contaminant plumes, earthquake faults and landslides. (page 11.)	The comment references Figure 18a of a report appended to the comment letter submitted in January 2009 and requests that the DEIR address the zones of concern for groundwater plume expansion shown on the figure. Chemical contamination at the proposed project site from historical hazardous materials uses is described and analyzed on pages 4.7-1 through 4.7-36 of the DEIR. UC LBNL notes that there are four – not five – general areas where Seismic Phase 2 activities would take place at the LBNL main hill site. The LBNL RCRA Facility Investigation, Corrective Measures Study and subsequent quarterly progress reports provide data showing that the groundwater contaminant plumes at LBNL are not currently spreading, but are either stable or shrinking. The Draft EIR is a stand-alone CEQA document and is not paired with a NEPA document (i.e., it is not an EIR/EIS).
CMTW-32	Figures 10 and 14 show the mapping of Wildcat Fault and the East Canyon Fault as well as the huge landslide area associated with these faults. It is quite incredible to observe that indeed LBNL/DOE (Department of Energy) knew of the presence of these earthquake faults and landslide areas, and yet proceeded with the construction of the Lab's Hazardous and Radioactive Waste Handling, Storage and Treatment Facility in this treacherous area in 1996, and now must attempt with seismic upgrades of the building (B 85), and the stabilization of the landslide beneath it. (pages 12-13)	Please see response to comment PH-13, below. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
CMTW-33	Figure 20 a. (page 14) shows various site conditions at future sites of LBNL's Long Range Development Plan.	The diagram provided by the Commenter is noted. Please see the 2006 Long Range Development Plan EIR for UC LBNL information on constraints and conditions related to the LBNL main hill site as well as to the Illustrative Development Scenario which is depicted on the Commenter's diagram. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
CMTW-34	Please read carefully Garniss H. Curtis' comments: " Most of the buildings of the Lawrence Lab. are on unstable ground filling the old caldera... The buildings on them will certainly move a few feet in a major earthquake if not hundreds of feet."	Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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CMTW-35	We ask you to include a very serious analysis of the B 85 situation and instead of a Band-Aid, a plan for relocating these dangerous operations to a more stable and accessible area.	The purpose of the proposed project is to create seismically safe, modern research facilities for UC LBNL programs and personnel. As described in the Draft EIR, a key objective is to remedy high seismic life safety risks in general purpose research facilities and lab-wide resource buildings. The Draft EIR includes an analysis of seismic hazards associated with Building 85/85A and a discussion of the seismic strengthening activities proposed to address them. The seismic safety rating of Building 85/85A would be "good" under the UC Seismic Rating System after completion of the proposed improvements. Also, please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site. For a discussion of alternatives to the proposed project, please see Chapter 5 of the Draft EIR.
CMTW-36	Attachment: Figure 2. LBNL Site Map, Groundwater Contamination Plumes and Contaminated Soil Site.	The commenter's materials have been received and reviewed. Because they do not address the adequacy of the EIR, no further response is warranted.
CMTW-37	Attachment: Figure 18a. Zones of Concern for Groundwater Plume Expansion Along Comp8led Faults, Bedrock Contacts, Landslides, Historic and Modern Creeks.	The commenter's materials have been received and reviewed. Because they do not address the adequacy of the EIR, no further response is warranted.
CMTW-38	Attachment: Figure 10. Compilation of Fault Mapping at LBNL in Strawberry Canyon Relative to Soil and Groundwater Contaminant Plumes.	The commenter's materials have been received and reviewed. Because they do not address the adequacy of the EIR, no further response is warranted.
CMTW-39	Attachment: Figure 14. Compilation of Landslide and Surficial Geology Maps 13a-13f in Strawberry Canyon.	The commenter's materials have been received and reviewed. Because they do not address the adequacy of the EIR, no further response is warranted.
CMTW-40	Attachment: Figure 20a. Various Compiled Site Conditi0ons at Future Building Sites of LBNL's Long Range Development Plan.	The commenter's materials have been received and reviewed. Because they do not address the adequacy of the EIR, no further response is warranted.
CMTW-41	Attachment: Contaminant Plumes of the Lawrence Berkeley National Laboratory and their Interrelation to Faults, Landslides, and Streams in Strawberry Canyon, Berkeley and Oakland, California. March 2007.	The commenter's materials have been received and reviewed. Because they do not address the adequacy of the EIR, no further response is warranted.
CMTW-42	Attachment: Picture. Contaminant Plumes of the Lawrence Berkeley National Laboratory and their Interrelation to Faults, Landslides, and Streams in Strawberry Canyon, Berkeley and Oakland, California. March 2007.	The commenter's materials have been received and reviewed. Because they do not address the adequacy of the EIR, no further response is warranted.
CMTW-43	Attachment: Announcement for Immediate Release. 5/9/84. Berkeley-Centennial Drive, connecting to "main" University of California-Berkeley campus to hilltop facilities, will reopen tomorrow (Thurs., May 10) after an eight-month closing. [refer to announcement for full text]	The commenter's materials have been received and reviewed. Because they do not address the adequacy of the EIR, no further response is warranted.

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CMTW-44	Attachment: Letter from John R. Shively, Consulting Engineer. 5/28/99. Subject: City of Berkeley Fire Fighting System. [refer to letter for full text]	The commenter's referenced materials -- a 1999 letter from John Shively regarding the City of Berkeley fire fighting system -- has been reviewed but does not address the adequacy of the EIR. However, as general information for the commenter, the Hillwater Fire Fighting System described in Shively's letter was not pursued by UC LBNL. In the 11 years since Shively wrote his letter, LBNL has seismically retrofitted its two existing 200,000 gallon water storage tanks and has added a third. These tanks are fed by EBMUD water and not local well water.
CMTW-45	The same seismic and landslide hazards that afflict the B 85 site are present at the proposed 43,000 sq.ft. Bio Lab (General Purpose Laboratory) location, just some 200 yards downhill to the SE, on top of the Wildcat Canyon Fault. The massive East Canyon Slide (see Figure 14.) extends all the way down to the bottom of Strawberry Canyon and continually undermines the stability of Centennial Drive, the only public (and emergency access) road through the Canyon. We ask that you abandon this new construction project at the proposed East Canyon site and instead very seriously consider the UC owned Richmond Field Station, as an alternative location.	The comment requests that construction of the proposed GPL at the Richmond Field Station be considered seriously as an alternative site, due to the seismic and landslide hazards that exist at the Building 74 SE Parking Lot site originally proposed for GPL construction. On pages 2-2 through 2-3, the DEIR notes that the project has been revised since the NOP and the location proposed for the GPL is no longer at the Building 74 SE Parking Lot site. Further, the Richmond Field Station is analyzed as an alternative site for GPL construction on pages 5-18 through 5-25 of the DEIR. The question of developing further facilities offsite was considered in the EIR prepared for the UC LBNL Long Range Development Plan. Based on that EIR, the Regents decided not to adopt an offsite alternative for the long range development of the Lab. That decision of the Regents was upheld in *Jones v. Regents* (2010) 183 Cal.App.4th 818.
CMTW-46	Indeed, the RFS, a prime Bay View property, must be considered as the future site for <u>all</u> LBNL Bio Science (Life Science) facilities, as well as for the Helios/EBl and CRT projects, in order to avoid the potential catastrophic failures predicted for the Strawberry Canyon Caldera during the next major earthquake - and to save publicly funded facilities, equipment and some 5000 human lives:	The Richmond Field Station is considered as an alternative in the Seismic Phase 2 EIR. See EIR Chapter 5. Also, please refer to response to Comment JMP-1-16. See response to comment CMTW-45.
CMTW-47	PS. Landslides in the Strawberry Canyon are triggered by heavy rains and underground water sources (during the dry season).	The comment, originally submitted in January 2009 and resubmitted in March 2010, states that landslides in Strawberry Canyon are triggered by heavy rains and underground water sources. The commenter thereby requests

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	The attached UC Press release of May 9,1984 describes the closure of Centennial Drive for a period of eight months, due to heavy rains and run-off in one of the main landslide areas. (page 17) Former UC Engineer John R. Shively describes a dry season landslide of August 1974, due to impounded hillwater of the Lennert Aquifer, as previous dewatering attempts by hydraugers had failed. (page 18) The EIR/ElS reports must include rainfall data for at least the past 40 years for the highest LBNL locations/elevations as well as current data regarding the Lennert Aquifer and its impacts at LBNL.	that rainfall data for the past 40 years at the proposed project site be included in the Final EIR. It is well known that small landslides have been triggered in the past by heavy rains at locations within the Berkeley Hills, including at LBNL. The landslide referred to in the commenter's 1984 article occurred on University land outside of LBNL. No LBNL buildings exist in the area proximate to this particular landslide. The landslides that occurred in 1974 were located in the general area of LBNL Building 77. These areas have subsequently been repaired and improved. No significant landsliding has occurred in this general area since that time despite multiple back-to-back wet winters and many subsequent storm events and incidents of heavy rainfall. The Lennert Aquifer is inferred to be the permeable volcanic unit that underlies the ridge northeast of Building 77 and northwest of Building 85/85A. The presence of this feature is well-recognized and has been accounted for in the Building 85/85A seismic strengthening design component of the Seismic Phase 2 Project. This feature is not close to and would have no effect upon the proposed General Purpose Lab. Please see Chapter 4.5 in the Draft EIR for a discussion of the Geology and Soils.
SSC-1-1	Thank you for the opportunity to provide public comment on the Draft Environmental Impact Report (DEIR) for the Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2 (Seismic Phase 2) Project. These comments are submitted on behalf of Save Strawberry Canyon, a non-profit corporation, organized for purposes of protecting the upper watershed of Strawberry Creek, for purposes of protecting Strawberry Canyon from development which is inappropriate at this hillside location, and for purposes of educating the public toward these ends. www.savestrawberrycanyon.org. The proposed project location is the Lawrence Berkeley National Laboratory's main campus, which is a hillside setting that straddles two canyons, i.e. Strawberry Canyon and Blackberry Canyon. These canyons are in the scenic Berkeley and Oakland hills and between the spur ridges off the	These introductory comments regarding the location of the proposed improvements and the underlying geology are noted. The location of the project is described in Chapter 3 of the Draft EIR, and Figure 4.8-1 of the Draft EIR shows a delineation of Strawberry Canyon Watershed and Blackberry Canyon Watershed. Please see response to Comment CMTW-6. The underlying geology is discussed in Chapter 4.5 of the Draft EIR. Please also see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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	coastal ridge that parallels the San Francisco Bay. Within this setting, the project is in Blackberry Canyon which is the upper watershed of the North Fork of Strawberry Creek.	
	The area is complicated geologically with the Hayward Fault traversing the "western edge of the LBNL site as shown in Figure 4.5-1.[1] An ancient landslide area that could mobilize during an earthquake underlies the Hazardous Waste Storage Facility.	.
SSC-1-2	The LBNL main campus is three miles east of Interstate 80 which is the western edge of Berkeley. This means that truck traffic must drive from one end of Berkeley to the other. By way of contrast, the Richmond Field Station alternative is very close to the freeway. What the Seismic Phase 2 Project DEIR fails to mention is the extent to which truck traffic (demolition, construction, hazardous and toxic waste materials) uses two lane residential roadways (e.g. upper Hearst Avenue) to access LBNL. Although the Project DEIR asserts that "(a)pproximately 15 local roadways provide access to LBNL...", the Project DEIR fails to describe the routing in sufficient detail to illustrate the extent and nature of the access problem. For example, Figure 4.12-1 shows a partial route although the figure title suggests otherwise. The Gayley Road, Rim Way, and Centennial Drive route lacks essential detail by not showing whether Centennial Drive traffic ends before reaching Grizzly Peak Boulevard, which is a residential two lane street at the top of the ridge.	The comment notes that the Richmond Field Station is closer to Interstate 80 than is the LBNL main hill campus and states that the DEIR has not sufficiently described the impact of construction truck traffic on local roadways in the vicinity of the LBNL main hill site. CEQA requires that the analysis of environmental impacts from traffic and transportation consider whether the proposed project would result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections. Pursuant to this requirement, the DEIR includes a detailed discussion of potential impacts from construction traffic and associated mitigation measures. All truck traffic from the LBNL main hill site is directed to use the City of Berkeley Designated Truck Routes linking the Strawberry and Blackberry Gates at LBNL with Interstate 80/580. Figure 4.12-1 in the DEIR illustrates these routes. The routes do not include Grizzly Peak Boulevard. Additionally, on pages 4.12-16 through 4.12-23 the DEIR provides a description of the findings of an analysis of existing conditions on local roadways in the vicinity of the LBNL main hill site that was undertaken for the DEIR. On the basis of that analysis the DEIR identifies a maximum allowable number of truck trips along each Designated Truck Route to ensure there is no significant impact to intersection operations. Further, on pages 4.12-20 through 4.12-21, the DEIR outlines measures put in place to ensure the maximum allowable number of truck trips would not be exceeded. Finally, the DEIR discusses potential impacts from construction traffic result-

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		ing from the project by itself (pages 4.12-25 through 4.12-26) as well as impacts from the proposed project in combination with other foreseeable development in the surrounding area (pages 4.12-34).
SSC-1-3	No mention is made of the residential land use along upper Hearst Avenue. The air quality impact analysis does not consider the urban environment on upper Hearst Avenue in which apartment buildings are built close to the street with very shallow setbacks. Neither does it analyze for air quality impacts to possible sensitive receptors living in the residential area. As such, air quality impacts from LBNL-related truck traffic are underestimated.	CEQA requires that the analysis of environmental impacts consider whether the proposed project would expose sensitive receptors to substantial pollutant concentrations. Sensitive receptors are members of the public most susceptible to respiratory distress, including asthmatics, young children, the elderly, people weak from other illness or disease, and those engaged in strenuous work or exercise. On page 4.2-31, the DEIR states that, for the purpose of providing a conservative estimate of impacts, all residences located outside the LBNL property boundary, which includes the area along Hearst Avenue, have been considered. Furthermore, also for the purpose of providing a conservative estimate of impacts, on the same page the DEIR states that all residences are considered to be sensitive receptors. Pages 4.2-31 through 4.2-36 discuss in detail potential impacts from construction and demolition traffic on off-site resident receptors, along with associated mitigation measures. Therefore, the urban character of upper Hearst Avenue and the potential air quality impacts to sensitive receptors in the area have been sufficiently considered under CEQA.
SSC-1-4	LBNL is an approximately 200-acre site, and the Seismic Phase 2 Project includes demolition, seismic retrofitting, and new construction in already developed areas of the hillside. Although in-fill development and consolidation would seem to be all well and good, the unfortunate result of this demolition and new construction project is the tangible expression of LBNL's ongoing commitment to invest in this geologically sensitive and poorly accessed area. After the project is completed, for example, the research activities and occupants at an off-site space will move up the hill rather than the other way around.	Since the publication of the Draft EIR, planning decisions made by UC LBNL management regarding future space needs have necessitated the revision of plans for the relocation of UC LBNL personnel associated with the proposed project. It was initially envisioned that approximately 100 UC LBNL life science personnel would relocate to a new general purpose laboratory (GPL) proposed for construction at the LBNL main hill site from off-site locations such as the 717 Potter Street facility in Berkeley and the Donner Laboratory on the UC Berkeley Campus. In line with recent UC LBNL planning decisions, however, the Seismic Phase 2 project description has been refined so that those 100 LBNL staff would remain in place at off-site facilities and the available GPL space would be used to provide laboratory space for LBNL personnel already at the main hill site, as well as for the co-location of related programs. In the course of this co-location, approximately 30 researchers would transfer from the adjacent UC Berkeley campus; however, several of these researchers already work on the main hill site or travel there regularly for meetings. As a

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		result, there would be only a negligible increase in the average daily population (ADP) of the LBNL main hill site. Regarding the geology of the LBNL site, please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
SSC-1-5	Several of the Project Objectives are written so as to guarantee that the Seismic Phase 2 Project will be located at this hillside location. For example, one of the Project Objectives is to locate life science research functions adjacent to the Nanosciences/Molecular Foundry Research cluster. Another is to "co-locate researchers and graduate students within a cluster of life science research facilities ... " By having project objectives linked specifically to the location of the Molecular Foundry, for example, any potentially viable off site alternative would be rejected out of hand. This is truly tragic given the availability of an underutilized industrial site owned by the university at the Richmond Field Station and where many life science research facilities could be consolidated.	The Project Objectives are not written to guarantee the location of the project, or components of the project, and off-site alternatives were not rejected out of hand. The EIR evaluated off-site alternatives, including the Richmond Field Station alternative and a leased off-site alternative. The Draft EIR contains a statement of project objectives that complies with the requirements set forth in CEQA Section 15124(b). As stated in the Guidelines, "A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary." Guideline 15124(b), setting forth the requirement to state project objectives, does not contain any statement that project objectives cannot include locational criteria. In *Save San Francisco Bay v. San Francisco Bay Conservation & Development Comm'n* (1992) the court upheld the propriety of considering the location of a project as part of the project purpose and objectives.
SSC-1-6	The already existing density of large research and development laboratories at the LBNL main hillside site is staggering. Rather than creating new campuses like was done when University of California at San Francisco (UCSF) outgrew the Pamassus Heights site, the LBNL in conjunction with the University of California at Berkeley (UCB) is intensifying development in the least accessible and the most seismically hazardous area of Berkeley.	The University does not agree that the LBNL main hill site is densely developed or developed near to or beyond its capacity. LBNL's 2006 Long Range Development Plan (LRDP) and its accompanying 2006 LRDP EIR explore such issues and lay out a course of development through 2025. Density of development at the LBNL main hill site is far below that found in a typical urban setting (e.g., UCSF, UCB, UCLA). For example, Seismic Phase 2 Draft EIR Figure 3-2, Project Components, diagrammatically illustrates the approximate area of development at LBNL versus the area that is undeveloped. The pervious (typically natural or undeveloped) surface at the LBNL main hill site is approximately twice as large as the impervious (typically developed) area. And, as the Commenter states in Comment SSC-1-4, above, "the Seismic Phase 2 Project includes demolition, seismic retrofitting, and new construction in

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		already developed areas of the hillside….in-fill development and consolidation….” Please see Draft EIR Section 4.5 for discussion of seismic issues and Section 4.12 for discussion of roadway accessibility. Also, see Land Use and Planning sections of both the Seismic Phase 2 EIR and the 2006 LRDP EIR to note that the proposed project would be sited within appropriate land use designations (Research and Academic and Support Services zones). Moreover, by demolishing the same approximate amount of facilities space at LBNL as would be constructed, the proposed project would not add to the overall density of the LBNL main hill site.
SSC-1-7	This is of grave concern because the Regents might be unaware of the cumulative development in the area, which includes two jurisdictions under their purview, i.e. not only LBNL but also the University of California at Berkeley (UCB). After all, the Regents certified two separate Long Range Development Plans, one for LBNL and another for UCB and did not have the benefit of a more coordinated approach to hillside expansion activities that commonly impact overlapping areas. Poor coordination is evident from the Seismic Phase 2 Project DEIR's failure to identify major, reasonably foreseeable planned projects in the area that would occur within UCB's jurisdiction. Two significant examples are the Strawberry Canyon Vegetation Management Project http://www.fema.gov/library/viewRecord.do?id=3111 and the California Memorial Stadium: Seismic Corrections and West Program Improvements project. http://www.cp.berkeley.edu/CP/Projects/CalMemorialStadium_SSC/Enivornmental/Integrated_Projects_Addendum2_CMS_West.pdf Both are UCB projects that will have impacts to the LBNL as well as impacts in commonly shared areas, e.g. public, city roadways. The Seismic Phase 2 Project DEIR identifies the following projects on the UCB Campus: South Campus Integrated Projects, Northeast Quadrant Sci-	The commenter's assertion that the Seismic Phase 2 Draft EIR did not identify or include the California Memorial Stadium: Seismic Corrections and West Program Improvements project for cumulative impacts analysis is incorrect. The California Memorial Stadium: Seismic Corrections and West Program Improvements project is part of the South Campus Integrated Projects (SCIP) described on pages 4.0-8 through 4.0-9 of the DEIR. All components of the Seismic Corrections and West Program Improvements project would be completed within the timeframe of the SCIP and have been accounted for in the cumulative analysis of the DEIR. The University of California (UC) has applied, through the State of California Governor’s Office of Emergency Services, to the Federal Emergency Management Agency (FEMA) for funding under the Pre-Disaster Mitigation (PDM) Program to conduct vegetation management activities in Strawberry Canyon, Claremont Canyon, and Frowning Ridge. The vegetation management activities would involve removal of non-native trees, including approximately 10,000 stems of eucalyptus trees from Strawberry Canyon, approximately 12,000 stems of eucalyptus trees from the Claremont Canyon area, and approximately 24,000 stems of eucalyptus and pine trees from the Frowning Ridge location. Vegetation management activities in areas of the East Bay hills under the jurisdiction of UC, including in Strawberry Canyon, are currently the subject of an Environmental Impact Statement (EIS) being prepared by UC in compliance

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	ence and Safety Projects, Helios, UC Berkeley Law School Infill, UC Berkeley Naval Architecture Restoration and Blum Center, and the Warren Hall Replacement. However, left out is the Addendum to the Southeast Campus Integrated Projects EIR. Approved by the Regents in January 2010 and before the Notice of Availability of the Seismic Phase 2 Project DEIR, the reasonably foreseeable project changes to the SCIP EIR include the following: (1) an Athletic Service Center of approximately 15,000 square feet, (2) lowering of the playing field an additional 2 feet. Although reasonably foreseeable and already approved by the Regents, these are changes to SCIP not mentioned in the Seismic Phase 2 Project DEIR. The Strawberry Canyon Vegetation Management Project was also left out of the analysis and even though the project would involve removal of 10,000 trees in 45 acres in Strawberry Canyon on lands adjacent to LBNL. A draft Environmental Assessment for the Federal Emergency Management Agency grant has been prepared. The project is vast in scope and reasonably foreseeable. The cumulative impact analysis of the Seismic Phase 2 Project DEIR was deficient by failing to identify all reasonably foreseeable planned projects in the area. The stadium-related projects might generate additional construction and demolition truck traffic, and thus generate even more traffic than anticipated in the supplement to the 2006 LBNL LRDP EIR with respect to one traffic impact and more traffic than anticipated in the Seismic Phase 2 Project DEIR which identified one significant unavoidable traffic impact. The deforestation/vegetation management project might interact with seismic hazards, e.g. landslides, that characterize the area and thus there would be unanalyzed cumulative geological impacts, among other impacts not identified by virtue of the project not being identified in the first place.	with the National Environmental Policy Act (NEPA). A draft of the EIS is not currently available for public review; however, based on information made public in an earlier stage of environmental review, because the minimal, adverse, short-term effects to biological resources, geology and soils, water quality, air quality, public safety, public services, transportation, and noise from the vegetation management activities would be limited to the construction phase and tempered by the implementation of avoidance and minimization measures by UC, it is not anticipated that a cumulative impact would result from the proposed project when considered in combination with the aforementioned UC vegetation management activities. While the removal of trees as proposed by UC could have GHG related impacts due to the loss of carbon sequestration potential, the proposed Seismic Phase 2 project would not contribute to that potential impact because it would involve the removal of only 3 trees, all of which would be replaced in conformance with UC LBNL policy. Please note that the Draft EIR has been revised to specifically identify the Strawberry Canyon Vegetation Management Project as a foreseeable UC Berkeley project that is analyzed in the EIR for potential cumulative impacts with the proposed project, and to clarify that there would be no cumulatively considerable impacts from the proposed Seismic Phase 2 project in combination with UC vegetation management activities proposed in the East Bay hills. Please refer to Chapter 3 of the Final EIR.
SSC-1-8	Neither does the Seismic Phase 2 Project DEIR adequately analyze geological impacts in this fault ridden area. Information provided in a separate comment letter from Garniss Curtiss, Professor Emeritus of Geology at UCB, will show the extent to which the project area is ridden with hazard-	Please see responses to Comment Letter GC and Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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	ous geological conditions. Of concern is the Seismic Phase 2 Project DEIR's failure to adequately inform the public in this serious matter.	
SSC-1-9	♦ For example the study by William Lettis and Associates regarding the Building 25/25B site and the location of the proposed General Purpose Lab is referenced but not included in the Appendix.[6] [6] "Lettis and Associates (2009) concluded that the evidence was equivocal as to whether a paleolandslide existed beneath Building 25 or not. However, if the landslide does exist, it is geologically stable and has not moved in thousands of years." Seismic Phase 2 Project DEIR, p. 4.5-20. This was the only geotechnical study referenced in the DEIR that was not included in the Appendix.	This document was cited in the EIR in compliance with CEQA Guideline 15148, which states that an EIR is dependent upon "information from many sources, including engineering project reports and many scientific documents" and that "these documents should be cited but not included in the EIR." The document was properly cited, and the conclusion of the document was also summarized in the EIR text.
SSC-1-10	♦ For example, the Geologic Map of the East Canyon Area (Figure 4.5-2) includes the General Purpose Lab but omits Building 85/85A, which is the Hazardous Waste Handling Facility, the building which is on top of the landslide area and the focus of the seismic mitigation part of the Seismic Phase 2 Project EIR.	The comment is noted. Figure 4.5-2 has been revised to more clearly indicate the location of Building 85/85A. Please see Chapter 3 of the Final EIR.
SSC-1-11	♦ The geotechnical investigations which are conducted are shallow in scope and insufficient to document the geological conditions of the area (see comment letter from Dr. Curtis). It should be noted toward this end that apparently inferior geotechnical studies prepared in 1994 for purposes of constructing Building 85 did not reveal the landslide area later identified in 1996.[7] [7] Seismic Phase 2 Project DEIR, pages 4.5-11, 12.	The geotechnical studies performed for the construction HWHF were conducted by experienced licensed professionals in accordance with generally-accepted professional procedures and practices and in conformance with the State regulations and guidelines applicable at that time. The State guidelines that pertain to seismically-induced landslides (Special Publication 117) were officially adopted by the State Mining and Geology Board on March 13, 1997. Special Publication 117 provides guidelines for evaluating and mitigating hazards for future projects, as required by the Seismic Hazard Mapping Act. Neither the guidelines nor the Act include retroactive provisions; LBNL is proactively strengthening the HWHF in accordance with the newest State guidelines pertaining to the evaluation and mitigation of potential hazards associated with seismically-induced landsliding (Special Publication 117A, dated 2008). Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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SSC-1-12	♦ Although the Seismic Phase 2 DEIR now documents the ancient landslide deposits upon which the Hazardous Waste Handling Facility/Building 85 sits, and although the Seismic Phase 2 DEIR also acknowledges that the landslide deposits could become mobilized in the event of a major earthquake, the DEIR underestimates seismic impacts as less than significant by insufficiently mitigating this hazard with a below-grade system of pier foundations and tiebacks.	Regarding the geology of the LBNL main hill site, please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site. The below-grade structural restraint system would bring Building 85/85A to a seismic rating of "good." The project would be designed and constructed in accordance with the requirements of the California Building Code and UC Seismic Policy. Additionally, the recommendations of the expert geotechnical reports commissioned for the proposed project would be implemented.
SSC-1-13	Finally, we wish to express our disappointment in the delay in issuing the Draft Environmental Assessment on this project. The Demolition, Retrofit, and Building DEIR announced the EA would be circulated concurrently with the DEIR comment period.[8] Moreover, the Department of Energy (DOE) issued a Notice of Intent to Prepare an Environmental Assessment as long ago as 11/25/08. We would fully expect the NEPA review process to be completed before demolition, retrofitting, or construction begins on this project. [8] Draft EIR for Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase Project, p. 1-4.	A delay occurred between scoping for the Seismic Phase 2 Project and the issuance of the Project EIR (and forthcoming EA under NEPA) precisely because the Project changed as a result of that scoping. Most notably, the location of the General Purpose Laboratory was moved from a controversial site in Strawberry Canyon to an in-fill site in the "Old Town" area of the Lab. It is expected that the Department of Energy will circulate the Draft EA for this project in the near future. Physical construction of the Seismic Phase 2 Project shall not begin until the CEQA and NEPA processes have been completed.
SSC-1-14	In closing, the Seismic Phase 2 Project DEIR gives short shrift to the environmental problems attendant to demolition and construction activities and ongoing operations at LBNL's main campus. Save Strawberry Canyon urgently requests that you give more serious consideration to consolidating research and development at a satellite campus and develop an appropriate plan forthwith.	The comment is noted. The question of consolidating all LBNL research and development activities at a satellite campus was considered in the EIR prepared for the UC LBNL Long Range Development Plan. Based on that EIR, the Regents decided not to adopt an offsite alternative for the long range development of the Lab. That decision of the Regents was upheld in *Jones v. Regents* (2010) 183 Cal.App.4th 818. With respect to the Seismic Phase II project, the EIR does evaluate two offsite alternatives. Regarding the geology of the LBNL main hill site, please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site. Please see also Chapter 3 of the Final EIR, which contains a more detailed analysis of the Richmond Field Station (RFS) Alternative to the proposed project.
SSC-2-1	This letter is a duplicate of SSC-1	Comments SSC-1-1 through SSC-1-14 apply equally to Comment letter SSC-2.

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GB-1	My comments are directed to the Seismic strengthening of the Hazardous Waste Handling Facility (HWHF) consisting of buildings 85,85A, 85B, a yard, and prefabricated units. To be brief, the Seismic Life Safety of the HWHF is likely also brief. In 1989 it was predicted "The Big One" will occur on the Hayward Fault within 30 years; that's just 9 years to go!	A key project objective is to remedy high seismic life safety risks in general purpose research facilities and lab-wide resource buildings. The below-grade structural restraint system proposed as part of the project would bring Building 85/85A, the HWHF, to a seismic rating of "good." The project would be designed and constructed in accordance with the requirements of the California Building Code and UC Seismic Policy. Additionally, the recommendations of the expert geotechnical reports commissioned for the proposed project would be implemented. Regarding the geology of the LBNL main hill site, please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
GB-2	The replacement HWHF should never have been built in its present location, situated behind Lawrence Berkeley Lab's Strawberry Canyon gate in Oakland on the East Canyon "Feature", a branch of the Wildcat Fault. In order to build the Non-Nuclear Facility, for the storage and treatment of radioactive and hazardous waste, it was necessary to do at least 4 things: 1. Ignore the Wildcat and East Canyon Faults and any branch "Features" upon which the Hazardous Waste Handling Facility now sits.	An Initial Study Checklist/Subsequent Mitigated Negative Declaration for Modification of the Hazardous Waste Handling Facility was prepared under CEQA in 1996 and subsequently adopted. Responses to public comment addressed concerns about the Wildcat Fault; alleged slope stability problems; the non-nuclear classification of the HWHF and associated 16,600 Curie tritium storage threshold, as well as a risk assessment which concluded that storage of tritium at the HWHF would not result in significant impacts. In 1998, the Alameda County Superior Court upheld the decision not to prepare a Supplemental EIR in connection with the 1996 changes proposed to HWHF operations, determining that the Initial Study Checklist/Subsequent Mitigated Negative Declaration for Modification of the Hazardous Waste Handling Facility met the requirements of the California Environmental Quality Act.
	2. Ignore the safety implications of slope stability problems. The Lab ignored slope stability problems despite: a) its own revelation in "Response to Public Comments" IS-7 (LBNL, April 1997) which indicated that a slide 50 feet long by 100 feet wide occurred along the access road to the site of the replacement HWHF in the winter of 1994/95. (Not an ancient slide !)	Slides in the Berkeley Hills that are investigated and found to be unstable can be repaired by retaining a licensed geotechnical engineer to design corrective measures and implementing those measures. The two slope stability concerns listed have been corrected. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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	b) the knowledge, provided in Public Comment, of a UC Berkeley press release which reported that Centennial Drive, which connects to the access road to the HWHF, was closed for 8 months in 1983/84 due to a huge slide. (Press release enclosed).	
	3. Failure to do a Supplementary EIR when 2 major changes were made to the original EIR: a) First: building a Non-Nuclear Facility for storage and treatment of radioactive waste and hazardous waste because Department of Energy's (DOE) Western Division "determined that the benefits of constructing a Nuclear Facility do not justify the additional costs," (April 5, 1994 memo to Joe Boda from Alex Dong - enclosed). Surely a Nuclear Facility has more safety features than a Non-Nuclear Facility. Is safety not worth the cost? In order to fall below the threshold for a Category 3 Non-Reactor Nuclear Facility, the one the original EIR indicated was to be built, the Tritium Focus Group was actually able to get the DOE to change the threshold from 1000 curies (CI) to 16,600 Cil (U.S. Dept. of Energy, DOE Standard "Hazard Categorization and Accident Analysis..., DOE STD-1027-92, Dec. 1992, Change Notice no. 1 , September 1997 - See Attach. I pp A-10, for Isotope H3, and A 12 footnote * - enclosed)	In addition, Regarding item 3.(a) of the commenter's letter, the DOE letter to which the commenter refers also stated as follows: "LBNL has completed a review of current inventory and proposed generation rates of radioactive and mixed waste and concluded that this Facility will operate below Category 3 Non-Reactor Nuclear Facility Thresholds as prescribed in DOE STD-1027-92." Both nuclear and non-nuclear facilities have safety features appropriate to their hazards. Adding nuclear safety features to a non-nuclear facility will not necessarily make it any safer (e.g., criticality monitors and nuclear accident dosimetry for a facility that does not have enough material to fission under any circumstances do nothing to increase safety). The key is to have the appropriate controls for the hazards present in a facility, whether nuclear or nonnuclear. The DOE Tritium Focus Group is comprised of both DOE federal and contractor personnel associated with tritium operations and was formed in 1991 in response to the Secretary of Energy's Task Force on tritium operations. In calculating the threshold for tritium, DOE utilized a conservative hazard categorization approach and criteria consistently applied to calculate thresholds for all radionuclides at all DOE nuclear facilities. The EPA methodology that DOE utilized to calculate the Hazard Category 3 nonreactor nuclear facility thresholds in DOE-STD-1027-92 (Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports) is summarized in this excerpt from DOE STD-1027-92: "Calculation of Category 3 Radiological Thresholds

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		In the Senior Nuclear Managers' meeting of October 26, 1992, DOE determined that it is reasonable to set the limit based upon the value that is accepted by the EPA for protection of workers for planned reentry into a facility after an incident (EPA in Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, EPA 400-R-92-001) and cited in Appendix 2A of the RadCon Manual, which is 10 rem. DOE has chosen to use an EPA model* to calculate the threshold quantities for Category 3. The model assumes that: the distance from the point of release to the point of exposure is 30 meters; the dose-equivalent limit is 10 rem effective whole body dose; and there is no radioactive decay (for the sake of conservatism and simplicity). For the period of exposure, the models used assume that persons are exposed for one day for inhalation and direct exposure, but that persons are exposed for longer periods through the ingestion pathway. See Section 3.0 of this Standard for guidance on the proper use of this Table. * 40 CFR 302.4 Appendix B, calculations described in User's Manual for the Radionuclides Database Version 1.02."
	b) Second: moving the fence-line a considerable distance from the then existing fence line around the HWHF in order to declare they are not exceeding the allowable radiation dose to the public. This would not be possible without a public hearing and eminent domain proceedings if private property, rather than UC Regents' property were located outside the existing fence-line. (See enclosed: 7/21/99 letter to Watson Gin, DTSC from G. Bernardi CMTW: 2/20/96 memo from G, Weinstein to D. Balgobin, LBNL: 7/14/94 letter to G. Bernardi from T. Powell, LBNL; 3/28/96 memo to H. Mitchell, UC and K. Berkner, LBNL from L. Bean, UC and R. Camper, LBNL.)	As stated in the May 28, 1996 memorandum referenced by the commenter, the fence line to which the commenter refers was moved as part of reducing the risk of wild land fire pursuant to a letter of cooperation between the UC Berkeley Chancellor and the Lawrence Berkeley Laboratory Director which included authority to UC LBNL to manage certain lands then covered by the UC Berkeley Long Range Development Plan. The memorandum discussed, for instance, the authority of UC LBNL and its contractors to use the Upper Jordan Fire trail to access the area above Building 74 so as to remove debris and plant material and the intention of both parties to update the Campus Hill Area Fire Prevention Committee annually on the progress in wildland fuel management made pursuant to the memorandum.
	I don't find it strange that the safety of the public and employees was not the paramount concern, and that CEQA was violated and radiation thresholds were changed to fulfill the headstrong plans and cost saving motives of	An Initial Study Checklist/Subsequent Mitigated Negative Declaration for Modification of the Hazardous Waste Handling Facility prepared under CEQA in 1996 and associated public comment responses addressed concerns

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	the HWHF decision makers as this was done under the tutelage of the University of California, the manager of the Lab. One can see parallels to UC's actions regarding the Memorial Stadium, wherein UC claimed it could dispense with the supporting concrete pier footing tied into the stadium, when the Judge ruled it violated the Alquist-Priolo law. Next, UC saw to it that the Stadium and other state buildings be totally exempted from Alquist-Priolo through the Omnibus Bill (2009). Such amendments are required to be non-controversial!	about the Wildcat Fault; alleged slope stability problems; the non-nuclear classification of the HWHF and associated 16,600 Curie tritium storage threshold as well as a risk assessment which concluded that storage of tritium at the HWHF would not result in significant impacts. In 1998, the Alameda County Superior Court upheld the decision not to prepare a Supplemental EIR in connection with the 1996 changes proposed to HWHF operations, determining that the Initial Study Checklist/Subsequent Mitigated Negative Declaration for Modification of the Hazardous Waste Handling Facility met the requirements of the California Environmental Quality Act.
GB-3	LBNL has expressed concern (DEIR Vol. I. 1/29/10 - p. 3-17) that the HWHF (Bldg 85/85A and 85B) is in the area of the official State of California Earthquake Induced Landslide Hazard Zone and that presents a hazard to the HWHF in case a landslide was mobilized in the event of a major earthquake. A sincere concern would mean compliance with the Alquist-Priolo Act. Do the cost and specifications of the system of concrete pier foundations and tiebacks to stabilize Bldgs. 85/85A comply with Alquist-Priolo?	The comment incorrectly implies that UC LBNL is not in compliance with the Alquist-Priolo Act. However neither the GPL nor Building 85/85A are within an Alquist-Priolo Earthquake Fault Zone, as indicated on pages 4.5-16 through 4.5-17 of the Draft EIR. Therefore, compliance with the Alquist-Priolo Act is not required. Nevertheless, as noted in the EIR, pages 4.5-21 to 4.5-22, stabilizing techniques are intended to reduce potential risk to acceptable levels in compliance with the State building codes.
GB-4	A sincere concern would mean compliance with the Alquist-Priolo Act. Do the cost and specifications of the system of concrete pier foundations and tiebacks to stabilize Bldgs. 85/85A comply with Alquist-Priolo?	Neither the GPL nor Building 85/85A are within an Alquist-Priolo Earthquake Fault Zone, as indicated on pages 4.5-16 through 4.5-17 of the Draft EIR. Both projects comply with Alquist-Priolo, which only regulates certain types of projects within designated Earthquake Fault Zones.
GB-5	If not, does this mean safety conscious members of the public and potential employees need to avoid both State and Federal government buildings in California?	No response is needed as the GPL and Building 85/85A are in full compliance with Alquist-Priolo. Please see response to Comment GB-3.
GB-6	Attachment 1: University of California, Office of Public Information, 5/9/84--McClendon--File #9070: FOR IMMEDIATE RELEASE Berkeley--Centennial Drive, connecting the "main" University of California-Berkeley campus to hilltop facilities, will reopen tomorrow (Thurs., May 10) after an eight-month closing [refer to attachment for full text].	The comment is noted; however, this comment does not address the adequacy of the DEIR, so no response is necessary.

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GB-7	Attachment 2: April 5, 1994, Memorandum from United States Government, Department of Energy. Subject: Classification of the LBL Hazardous Waste Handling Facility [refer to attachment for full text]. Enclosure: DOE-STD-1027-92, December 1992, Change Notice No. 1, September 1997 - DOE Standard - Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports; pages A-10 and A-12. [refer to enclosure for full text]	The comment is noted; however, this comment does not address the adequacy of the DEIR, so no response is necessary.
GB-8	Attachment 3: 7/21/99 letter to Watson Gin, Acting Deputy Director, Hazardous Waste Management, California Dept. of Toxic Substances Control, from Gene Bernardi, CMTW. Re: EPA ID # CA 4890008986-Lawrence Berkeley National Laboratory (LBNL) Permit Modification Request re: Hazardous Waste Handling Facility (HWHF) Operations [refer to attachment for full text]. Enclosure A: Feb 20, 1996 memo to David Balgobin, LBNL, from Gerald Weinstein, M.H. Chew and Associates. Enclosure B: July 14, 1999 letter to Gene Bernardi, CMTW, from Terry Powell with attached Joint Memorandum, signed in concurrence April 11, 1996. Enclosure C: Sept. 1997 Change Notice #1 of *DOE Standard, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports,* (US DOE Attachment 1, p A-12) [refer to enclosures for full text].	The comment is noted; however, this comment does not address the adequacy of the DEIR, so no response is necessary.
GC-1	This is written in response to the invitation for public written commentary regarding the subject project, as required by the California Environmental Quality Act (CEQA) for a draft Environmental Impact Report (DEIR) and for all requirements of the National Environmental Protection Act (NEPA). We hereby advise you of the hazards of the construction on the LBNL (Lab) site, as presently proposed in the subject DEIR. We also wish to emphasize	The comment is noted. The Draft EIR discusses potential hazards and associated mitigation measures on pages 4.7-1 through 4.7-36. Please also see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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	the dangers to people, structures and vulnerable research facilities that may in any way contain hazardous materials, should this project be executed at the proposed LBNL site.	
GC-2	Regarding the geology of the site the observations cited in the DEIR concerning the adequacy for construction are seriously deficient. Lacking are geological studies for the General Purpose Laboratory (GPL) deep enough to provide any understanding of the geology below approximately three meters.	Analysis of soil compositions in the vicinity of the Building 25/25B site in the DEIR draws from the findings contained in Lettis and Associates, August 2009, Palaeolandslide Investigation Building 25, Lawrence Berkeley National Laboratory, Berkeley, California. Three borings were drilled as part of initial feasibility-level geologic assessment activities for the GPL. The deepest boring extended to a depth of 106.2 feet (about 32 meters). Additionally, a supplementary geotechnical report for the Building 25/25B site was finalized in April 2010 and will be made available for public review at the time the FEIR is published. This report finds that the geologic conditions of the site are suitable for construction of the GPL.
GC-3	Furthermore the severe destruction to the Lab infrastructure is predictable due to the mercurial geology and steepness of the Lab site.	Construction will be performed in accordance with the California Building Code and University of California Seismic Safety Policy. The DEIR includes a detailed discussion of the geologic conditions in the vicinity of the proposed project site as well as an evaluation of the associated risks. Please see page 4.5-1 through 4.5-25.
GC-4	Of primary concern should be the fact that an earthquake is now predicted to be imminent on the Hayward Fault trace. That trace runs completely through the lower west side of the Lab site. When the event occurs, it is predicted to destabilize the entire Lab site. CEQA establishes significant relevant criteria for impacts. It asks if the impact of the proposed project related to geology and soils would be considered significant. Certainly it would expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: a) rupture of a known earthquake fault b) strong seismic shaking c) seismic-related ground failure, including liquefaction d) landslides	Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site. Please also see Chapter 4.5 and the Draft EIR's discussion of these potential risks as they may relate to the project.
GC-5	The attachments will describe the underlying geology of the LBNL site which should convince you that:	Responses to the commenter are as follows: 1. LBNL does not agree that the referenced materials adequately demonstrates

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	1. No new buildings of any kind should be construsted [sic] on the present LBNL site. 2. A plan to relocate all the existing facilities to a safer location, preferably well west of the known Hayward Fault trace should be instituted 3. The available UC Richmond Field Station site should be seriously considered.	that no new buildings should be constructed at the present LBNL main hill site. The commenter's maps and cross sections depicting the "underlying geology" are not consistent with the site-specific data (i.e. borings, trenches, surficial geologic mapping) that have been developed over many years by UC LBNL researchers and consultants. The "collapsed caldera" hypotheses posited by Dr. Curtis is viewed as speculative, and appears to be generally contradicted by onsite data. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site. In addition, construction will be performed in accordance with the California Building Code and University of California Seismic Safety Policy. 2. The comment is noted. However, the GPL and Building 85/85A are not close to the active Hayward fault trace and are also well outside of the Earthquake Fault Zone that surrounds the Hayward fault. These distances of separation are considered more than adequate throughout the State of California for projects of all types. 3. The Richmond Field Station is considered and analyzed as an alternative in the EIR. Please see Draft EIR Chapter 5. The question of developing further facilities offsite was considered in the EIR prepared for the UC LBNL Long Range Development Plan. Based on that EIR, the Regents decided not to adopt an offsite alternative for the long range development of the Lab. That decision of the Regents was upheld in *Jones v. Regents* (2010) 183 Cal.App.4th 818.
GC-6	Transcript of Video "The Fault: Quakes, Slides, & the Lawrence Berkeley Lab" I'm Ignacio Chapela, Professor of Environmental Sciences at UC Berkeley. I'm on the board of Save Strawberry Canyon and we've made a video for the university community, the neighbors of Strawberry and Blackberry canyons, and the citizens of the Bay Area. This concerns the danger from the buildings already on the hillside and from those planned for it. I am standing on the lower fire trail, south of Centennial Drive. Behind me	The commenter's assertions regarding long-term growth at the LBNL main hill site are addressed and analyzed in the 2006 Long Range Development Plan EIR. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site for a discussion of the stability of land at the project site.

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	the black box you see is the new Molecular Foundry, 96,000 square feet. UC and the National Lab want to construct 980,000 new square feet of buildings while demolishing 320,000, thus adding 660,000 square feet to the lab campus. They want 500 new parking places and 860 new employees. All of this is planned for Blackberry Canyon, directly above Hearst Avenue and its houses and dorms, and in Strawberry Canyon, north and south of Centennial Drive, above the stadium, Greek Theater and dorms. This is extremely unstable land, and close to the Hayward Fault. This video will explain our concerns.	
GC-7	Transcript of Video "The Fault" (cont.): I'm John Shively. In the early 70's I was the Principal Engineer at UC Berkeley Office of Architects and Engineers. In August of 1974, during a major drought, I received a call from Lawrence Berkeley Lab advising that the steep hillsides were sliding in two separate areas near the Lawrence Hall of Science, due to underground water. I called consulting civil engineer, Ben Lennert, and we drove up to observe the slides. The most active slide was on the steep hillside below Lawrence Hall of Science and above the Lab Hilac accelerator building. It had broken a lab building, broken an internal lab road, and cut the underground utilities. This slide was growing rapidly and threatened the Lawrence Hall of Science.	Please see response to Comment PH-18. The issue of possible landslides and soil stability in general is discussed in the Draft EIR at pages 4.5-23 to 4.5-24.
	The other slide was located on the steep hillside above the Lab corporation yard and just below the steep portion of Centennial Drive. It was slower moving but had severed the underground utilities that served the Hall of Science and threatened to take out Centennial Drive above the corporation yard. Ben's first idea was to drill hydraugers, which are horizontal wells, into the corporation yard hillside, hoping to tap the aquifer and let gravity drain the	

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	water. He drilled several hydraugers but failed to hit the aquifer. I then surmised that that much water had to be coming from the much larger watershed located higher up in the expansive Grizzly Peak area of Tilden Park. I proposed drilling a conventional vertical well just at the south end of the Space Science Lab. We drilled the well and hit the aquifer at about 150 feet down. When we commenced pumping, both slides stopped. We directed the water south into Strawberry Creek. Some of it was intercepted for very welcome use in the drought parched UC Botanical Gardens.	
GC-8	Transcript of Video "The Fault" (cont.): I'm Garniss Curtis, emeritus professor in the department of Earth and Planetary Sciences at the University of California, Berkeley. In a Letter I wrote to the regents, I emphasized that there should be no buildings in Strawberry Canyon near the Stadium nor Blackberry Canyon and these are the reasons why. In working with Ben Lennert 25 or 30 years ago investigating landslides and also places that new buildings could be made, I found geologic reasons that threaten these areas. The geologic setting is this. Here is the active Hayward Fault. Here is the Wildcat Canyon Fault and between them once 10 million years ago was a volcano. That volcano erupted violently and made a big cavity in which this whole area collapsed to form a great void. The outlines of the western margin of that void is here from the botanical garden going northwards several miles and includes all of these buildings resting on material that collapsed into the void we call a caldera. In working with John Shively and Ben Lennert concerning the slides on Centennial and this location which threatened these buildings to the west, we found we were in volcanic rock fragments, volcanic rock, in clay matrix which was sliding as water moved it. In this caldera filled with debris from the old cone, it left great cavities between large blocks of andecite which collected water and that water was gradually seeping out and causing these landslides, and unless they pumped that water out some way, we'd continue to have slides in this caldera material. A horizontal hole drilled did not re-	Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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	lieve the water, but when a vertical hole was put down, it bumped into one of these cavities filled with water and over the next 10 years 16 or 14 million gallons of water were pumped out. That's a huge amount of water to pump out of one place, but that was a function of the collapsed material making many cavities that were not filled with ash and left vacancies for water. The Hayward Fault, after passing close to Bowles Hall, goes right through the stadium. where it has offset the two sides of the stadium since its construction in 1923. The interior pillars damaged some 30 years ago have only recently been reinforced with concrete and reinforcing steel.	
	Behind Hearst Mining Bldg and a few feet to the east if the Lawson Adit, , that is a tunnel going eastward to the Hayward Fault. In the tunnel are several exposures of the offset of Strawberry Creek as determined from the contained rounded cobbles of Strawberry Canyon origins. This indicates a displacement of more than 2000 feet north along the Hayward Fault. East of the Hayward Fault are cretaceous sedimentary rocks older than 65 million years. These are dipping westward at 20 to 30 degrees. (Above Stem Hall)What we're looking at here is sandstone, bedded sandstone, and you can see the parting dipping off toward the Bay and two parting zones dipping off toward the Bay on the outcrop of the sandstone and disappears up hill there and disappears under the soil. (drawing) This caldera is like a great big tub of mud with no rigidity to it at all and much heavier than water, pressing against these cretaceous beds dipping westward. The US Geological Survey has made extensive study of the Hayward Fault and found that the return time on earthquakes going back to the time of Christ is about 130 years. The last major quake was in 1868, 140 years ago. In short it's overdue. The survey by USGS says that there's a 65% chance of a major quake, 6.5 to 7 magnitude, occurring in the next 35 years. If an earthquake occurs when these beds have been soaked with winter rain, the chances of a major landslide are great along the slippage planes of sandstone dipping westward towards campus. Buildings in the lower parts of both Strawberry and B Canyons would be buried if not destroyed. These buildings will move Keep in mind the Loma Prieta quake of 1989 of magnitude 6.9 which from a distance of over 60 miles destroyed a section of the Bay Bridge, a section of the over-	Please see responses to PH-17, GC-11, GC-12, GC-14 and Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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	head freeway in Oakland. killing 63 people, and many houses on filled ground in the Marina of northern San Francisco some 70 miles from the quake! No major buildings should be built on the hills or canyons above the campus.	
GC-9	Transcript of Video "The Fault" (cont.): (Ignacio)There are alternatives to constructing more buildings above campus. These alternatives are cheaper and certainly much safer and many are owned by the university. I hope that the Regents and administrators of the university will consider the dangers to students, faculty and neighbors of building on these fragile hill sites so close to the Hayward Fault. This video is being distributed in order to alert those at risk as well as those with the responsibility for the safety of the campus and its neighbors.	Alternatives to the proposed project are presented and analyzed in Draft EIR Section 5, including a Richmond Field Station Alternative and a Leased Space Off-Site Alternative. The question of developing further facilities offsite was considered in the EIR prepared for the UC LBNL Long Range Development Plan. Based on that EIR, the Regents decided not to adopt an offsite alternative for the long range development of the Lab. That decision of the Regents was upheld in *Jones v. Regents* (2010) 183 Cal.App.4th 818.
GC-10	Attachment: Map of "LBNL with Extent of Caldera"	The extent of the caldera shown on the map approximately coincides with the mapped contact of the Great Valley Sequence and overlying younger Orinda Formation (sedimentary) and Moraga Formation (volcanic) bedrock units. This contact has been generally characterized by previous researchers and consultants as a fault. The contact has been directly observed at multiple locations at LBNL (e.g. in trenches near Buildings 62 and 66 and, more recently, in the excavation cut east of the Guest House). The referenced map suggests that this contact may actually be the edge of a collapsed caldera, a hypothesis that appears to be unsupported by and inconsistent with onsite observations. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
GC-11	Attachment: Section of Caldera	The section presented on the attachment shows a deep bowl-shaped feature labeled as "volcanic rock" underlying most of LBNL and all of the Lawrence Hall of Science. Pease see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
GC-12	Attachment: "Garniss Curtis, Professor Emeritus, Earth and Planetary Sciences, UCB":	The initial geotechnical investigation of the Building 25/25B site undertaken by Alan Kropp and Associates found that the northern portion of the site is

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	The soil profiles obtained by Lettis from shallow trenches around Building 25 revealed expansive soils that soak up water during wet seasons and would be subject to sliding during a major earthquake. (Lettis, Appendix Plates 2 & 3 attached here) The trenches also revealed isolated blocks of andesite (volcanic stone) 10 and more feet in length and 4 feet in diameter. Elsewhere in the Berkeley area are large pieces of andesite 10 feet in width and 30 feet in thickness. These are all randomly oriented. All of these are in a matrix of clay-rich sedments, sometimes horizontally bedded, often, though, in contorted beds, and some piled on top of each other. For example, in a small quarry a few hundred feet north of LaLoma Avenue, these blocks show deformation from the differential pressure they were under from deep burial. The Orinda Formation is named for outcrops near Orinda, beautifully exposed on the east side of Caldecott Tunnel. The consultants' reports label almost any sandy and pebbly beds as Orinda Formation. There is no Orinda Formation in the caldera. The formation is older than the volcano. Lettis and Associates separate some units and identify formations which, on Grizzly Peak Boulevard may easily be identified as the Orinda and Moraga Formations. Lettis and Associates, however, identify any sandy beds exposed at the surface or in bore holes as Moraga Formation. This sandy material is missing, however, in the Moraga Formation found along the road to Redwood Canyon. The Moraga thrust fault at the base of the Moraga andesite flows is well exposed there.	located on bedrock and the southern portion of the site is located on soils which are not highly expansive. Additionally, investigations of surrounding sites indicated that soils in the area were generally of low to moderate expansiveness. Subsequent supplemental geotechnical investigation reports finalized by Kropp in May 2010 confirmed that soils under the roadway proposed for widening west of Building 25/25B are not highly expansive, but found that soils under the proposed utility plant are highly expansive. The Final Geotechnical Investigation Report Supplements of May 2010 make recommendations to account for these concerns regarding the presence of expansive soils in the area of the roadway widening and the utility plant. The Geotechnical Investigation report for the GPL includes geotechnical recommendations that account for the possibility that expansive soils may be present in certain areas beneath the GPL site. These recommendations would be implemented in the design of the GPL, and its utility plant and other improvements associated with the GPL planned facility. Please note that the Draft EIR has been revised to include details of the now finalized Supplemental Geotechnical Investigation for Building 25/25B. Please refer to Chapter 3 of the Final EIR. Additionally, the suggestion that "there is no Orinda Formation" in the area Dr. Curtis maps as the caldera generally contradicts: (1) decades of investigative studies by multiple researchers and consultants working at LBNL; (2) regional geologic maps published by the USGS and others. Regarding comments pertaining to geologic conditions elsewhere, please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
GC-13	Attachment: "Garniss Curtis" (cont.): None of the reports done for this EIR contain a reputable geologic map of the LBNL area.	The geologic maps presented in the 2006 and 2010 AKA reports were prepared by the engineering geologic consultant firm William Lettis & Associates, Inc. (WLA), which was recently acquired and is now Fugro William Lettis & Associates, Inc. (FWLA). The geologic investigations conducted by WLA/FWLA in relation to the HWHF were managed, signed, and stamped by a California-registered Certified Engineering Geologist who is currently a Principal with the firm. All WLA/FWLA technical personnel that work on LBNL projects

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		have advanced degrees and years of experience in their specialty areas, FWLA/WLA is generally considered to be among the few top-tier engineering geologic consulting firms in the Bay Area and routinely works on projects throughout the region as well as nationally and worldwide.
GC-14	More investigation of areas outside the Lab site might have alerted the consultants that the LBNL area is geologically different from any other area in the Berkeley Hills. It is bounded on the east by the Wildcat Fault and on the west by an arcuate contact between Upper Cretaceous Great Valley Sequence, well bedded shales and thin sandstone beds, all of which dip westward at about thirty degrees. (See Transcript and its figures) The boundary has been named the "Chicken Creek Fault"; it is probably not a fault as it approximately makes an arc starting at the Wildcat Fault immediately south of the Botanical Gardens and swinging around to meet the Wildcat Fault crossing Shasta Road not far uphill from the Brazilian Room. We identify this contact as the margin of a caldera which collapsed after a large eruption evacuated the magma chamber under the volcano. In fact we think we have identified a large welded ash flow that poured out of this magma chamber to the west of the Hayward Fault. It has the same age (10 million years) and mineral composition as a rhyolite tuff exposed in the center of Moraga volcanics along Grizzly Peak Boulevard and at the southern end of the Moraga Formation at the type locality. The collapsed volcanic rocks that fell and slid into the caldera were subsequently buried by sediments and volcanic ash. Many voids between the piles of blocks and andesite collected ground water, recently tapped by wells drilled by Lennert and Shively. Lennert told me that over a period of ten years, 14 to 16 million gallons of water were pumped out. (See Lennert Letter of 1987).	The commenter provides interpretations and opinions that are generally unsupported by corroborating data. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site, and Response to comment G-11. The comment pertaining to groundwater pumping is noted.
	The US Geological Survey predicts a major earthquake of magnitude 6.7 or greater will occur on the northern section of the Hayward Fault with a 62% probability before 2032. The great earthquake of 1868 broke along the southern part and extended almost to the campus of UC. The Hayward Fault runs along the west margin of LBNL so that there will be severe ground-shaking in this area. Consider the damage caused to the Bay Bridge and Cyprus Ramp from the Loma Prieto quake in 1989, whose epicenter	The USGS considers the probability of at least one magnitude 6.7 or larger earthquake occurring on the Hayward fault before 2037 to be 31 percent. The probability of at least one magnitude 6.7 or larger earthquake occurring anywhere within the San Francisco Bay Region before 2037 is 63 percent. The 1868 earthquake occurred on the southern segment of the Hayward fault and did not extend as far north as Montclair.

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	was 50 miles away. Should the northern Hayward Fault undergo a comparably large failure with an epicenter, say, 7 miles from LBNL, the force would be 50 times that which struck the Bridge and Ramp in 1989. The sediments collected in the caldera are not suitable material upon which to build. A major earthquake during a wet period could lead to landslides in caldera soft sedimentary rocks and the collapse of the west wall of the caldera with its stratified cretaceous shales dipping westward toward dormitories and houses. Measurements show that the Hayward Fault is creeping right laterally about 0.5 cm per year while the east side of the fault is rising 0.5 cm per year, becoming more unstable. Sooner or later this cretaceous wall will slide, taking with it most of LBNL. The imminent earthquake of the Northern Hayward Fault might trigger it.	UC LBNL recognizes the hazard associated with strong ground shaking; as discussed in Chapter 4.5 of the Draft EIR, the GPL and Building 85/85A projects will be designed and constructed in accordance with the requirements of the California Building Code and UC Seismic Policy. For responses to comments pertaining to the caldera and westward-dipping beds west of the caldera, please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site, and Response to Comment GC-11. The commenter's opinion that there will be a slide that will "take with it most of LBNL" is unsupported by geologic data. Notably, there is no evidence that large-scale landsliding has occurred in this area over the past tens of thousands of years, during which time hundreds of large earthquakes would have occurred along this portion of the Hayward fault. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
GC-15	Attachment: Appendix C-2A, Lettis Plate 2	The comment is noted.
GC-16	Attachment: Appendix C-2A, Lettis Plate 3	The comment is noted.
GC-17	Attachment: Letter from Lennert and Associates to Gaetano P. Russo, UC Dept. of Facilities Management, dated 27 August 1979. Subject: Hill Area Dewatering Program [refer to letter for full text]	This attachment describes geologic conditions encountered during the drilling of Horizontal Drain 789-A. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site. For a discussion of springs at the LBNL main hill site, please see response to Comment CMTW-9.
GC-18	Attachment: Letter from Lennert and Associates to Gaetano P. Russo, UC Dept. of Facilities Management, dated 28 May 1980. Subject: Slide at Centennial Drive Overpass - Progress Report. [refer to letter for full text]	The attached letter does not address the adequacy of the Seismic Phase 2 EIR. Please refer to the Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site, and responses to comments GC-4 and GC-5.
GC-19	Attachment: Letter from Lennert and Associates to Gaetano P. Russo, UC Dept. of Facilities Management, dated 10 September 1980. Subject: Hill Area Stabilization Program. [refer to letter for full text]	The attached letter does not address the adequacy of the Seismic Phase 2 EIR. Please refer to the Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site, and responses to comments GC-4 and GC-5.
GC-20	Attachment: Letter from Ben J. Lennert to Gene B. Cross, Assistant Vice Chancellor, Dept. of Facilities Management, UC Berkeley, dated 30 June 1987. [refer to letter for full text]	The attached letter does not address the adequacy of the Seismic Phase 2 EIR. Please refer to the Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site, and responses to comments GC-4 and GC-5.The comment is noted.

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GC-21	Attachment: "Questions from the Appendices": Where are the specific reports, in January in draft form, mentioned in 4.5 p. 18?	Final geotechnical investigation reports for Building 25/25B and Building 85/85A were completed in April 2010 and will be made available to the public with the Final EIR.
GC-22	Attachment: "Questions" (cont.): Where is Alan Kropp 2009, mentioned in the Wm Lettis report on Bldg 25 but not included?	Geotechnical reports prepared by Alan Kropp Associates for the proposed project will be made publicly available with the Final EIR.
GC-23	Attachment: "Questions" (cont.): Alan Kropp 2007 (Bldg 85) advised tiebacks and drilled piers to strengthen Building 85. These would simply increase the number already there, drilled into claystone and siltstone, not bedrock. The consultants warn, moreover, of landslides in this area, especially seismically-induced. They found slumps and instability within mixed landslide deposits. See especially the charts on page 26 (2006A) where the stability is analyzed and fails under certain conditions.	There are currently no tiebacks at Building 85/85A. The claystone and siltstone referred to by the commenter are of the Orinda Formation, the in-place bedrock formation that exists beneath most of the LBNL facility. The charts (tables) referred to by the commenter relate to the upcanyon-downcanyon landslide that exists east of Building 85/85A; this landslide does extend beneath either building.
GC-24	Attachment: "Questions" (cont.): The hazards to be mitigated. 4.5-19 "The proposed project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides." Rather than suggest mitigation measures, the report promises more specific investigations. The trenches were too shallow to show anything save the presence of large volcanic rocks in a clay matrix, the sign of the caldera.	Trenches excavated for the GPL and Building 85/85A projects exposed volcanic rocks in depositional contact with underlying older sedimentary rocks. This structural relationship is entirely consistent with geologic interpretations developed by researchers and LBNL consultants extending back more than 100 years (to Andrew Lawson and Charles Palache, 1900-1901). The interpretation that the GPL and Building 85/85A sites are with a volcanic caldera <u>where the Orinda Formation is not present</u> is unsubstantiated and is in direct conflict with onsite geologic observations, borings and other site-specific data developed over the past 100+ years. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
GC-25	Attachment: "Questions" (cont.): 4.5-p. 24 Expansive soil. 2006 EIR determined soil was not expansive save in southern part of LBNL site, which includes Bldg. 85/85/A. Alan Kropp 2006A (for Bldg 86, between 83 and 85 and for 85) shows Atterberg Limits far exceeding those of non-expansive material.	Expansive soils are pervasive throughout much of the Bay Area and not unique to LBNL (Expansive soils shrink and swell in response to changes in soil moisture and have the potential to cause damage to improvements that are supported directly upon them). In the Bay Area, this seasonal zone of significant moisture change typically extends several feet below the ground surface. Slope stability concerns associated with expansive soils are mostly confined to a near-

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		surface zone that is subject to cycles of wetting and drying. Building 85/85A are constructed on engineered fill pads and there is little potential for there to be significantly expansive soil directly beneath either building. As discussed in Chapter 4.5 of the Draft EIR, if expansive soils are present under Building 85/85A, the original below-grade, building foundation type (i.e. drilled piers) reduces risks associated with expansive soils.
GC-26	Attachment: "Questions" (cont.): Atterberg Limits were not cited for Bldg. 25 area. What are they?	Please see response to Comment GC-12. Two samples were taken for soils under the roadway proposed for widening west of Building 25/25B. Atterberg testing found a plasticity of 22 and 25 respectively, which indicates soils are not highly expansive. Additionally two samples were taken for soils under the proposed utility plant. Atterberg testing found a plasticity of 56 and 46 respectively, which indicates soils are highly expansive at this particular location. However, as discussed above in response to Comment GC-12, slope stability concerns associated with expansive soils are mostly confined to a near-surface zone that is subject to cycles of wetting and drying. The Final Geotechnical Investigation Report Supplements of May 2010 make recommendations to account for these concerns. These recommendations would be implemented in the design of the GPL, its utility plant, and other improvements associated with the GPL planned facility.
GC-27	Attachment: "Questions" (cont.): Without consideration of the caldera and the past evidence of its instability, (the landslides of 1974 and the later problems of dewatering the hill during small seismic events: Lennert September 1980), these consulting reports and the mitigation suggestions are dangerously inadequate.	Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
JMP-1-1	The proposed Project entitled: "Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2 is intended to seismically strengthen an existing structure (Bldg. 85), and construct a 43,000 gross square foot General Purpose Laboratory (GPL) located at the Lawrence Berkeley National Laboratory. Indeed, it is timely to focus on seismic issues given the nature of the steep hilly terrain webbed with a dozen historic strike-slip faults that splay to the	UC LBNL is always careful to focus on the geotechnical characteristics of every site it proposes to construct on. In regard to the commenter's assertion about a dozen "historic strike-slip faults that splay to the nearby creeping Hayward Fault Zone," it should be noted that any faults that may exist outside of the official Alquist-Priolo Earthquake Fault Zone (AP Zone) are not considered to be "active faults" (earthquake fault rupture most commonly occurs among faults that are considered to be active). The AP zone is located west of Building 50 and very few LBNL buildings exist within that zone (most nota-

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	nearby creeping Hayward Fault Zone. it is admirable that the consultants provided clear and well-done images for this proposal, and more importantly for frameworking newer knowledges for future planning for the LBNL.	bly, Buildings 65 and 88). The principal planning and design issues affecting buildings outside of the AP Zone relate to strong groundshaking and not fault rupture potential.
JMP-1-2	However, to strengthen just ONE building, build a new building and destroy some trailers does not make the remaining buildings safer.	The comment is noted. The proposed Project is not intended to seismically upgrade every building at the LBNL main hill site. The Project scope is appropriate to meet the stated project objectives. Please see Draft EIR pages I-4 and I-5 for Project Objectives.
JMP-1-3	While it is a 'good thing' to provide seismically safe modem life science research space at the Berkeley Oakland hilly terrain land of the University of California is not at all reasonable - it is experimental. It is an experiment in human safety.	Construction will be performed in accordance with the California Building Code and University of California Seismic Safety Policy. Please also refer to Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
JMP-1-4	Had the founder of the Radiation Laboratory, the Nobel Prized scientist, Ernest Orlando Lawrence (1901-1958) lived longer, he likely would have steered the course of the Lab to develop a world-class research campus at the flat more stable land of the Richmond Field Station. The story is that Lawrence built the cyclotron east of classrooms and residences in virgin hills where people rarely went so as to absorb the escaping radiation-thus protecting human safety. It can be argued that it was never his intention to populate the Radiation Laboratory with more facilities, bringing more scientists, students, and support staff etc. near his radioactive experiment. He had tried to keep the campus community safer by moving his new experiments up into the hills. Dr. Lawrence was 58 years young when he died; some say from radiation harm.	The comment is noted. The University respectfully disagrees with the Commenter's assertion about Ernest Orlando Lawrence Berkeley National Laboratory's founder. Ernest Orlando Lawrence is internationally recognized as one of the founders of interdisciplinary science, and Berkeley Lab is where he pioneered this concept. Accordingly, he spoke and wrote extensively about, and acted in his capacity as Lab Director upon, his conviction that the Berkeley Laboratory should be populated with researchers and research programs from a wide variety of scientific disciplines. In particular, he wanted biologists and a broad range of other types of researchers to work side-by-side with physicists. UC LBNL continues to develop in accordance with E.O. Lawrence's original vision.
JMP-1-5	Just imagine constructing a planned research park at Richmond? The University's Mission Bay campus serves as a flat land prototype--with much space for expansion and for nearby businesses development. Today, with the costly engineering to build, restore and modify existing facilities to meet current seismic safety guidelines, it would be prudent to change the Long Range Development Plan for upwards of 15 new buildings starting with the General Purpose Laboratory to site such at the Richmond	The question of developing further facilities offsite was considered in the EIR prepared for the UC LBNL Long Range Development Plan. Based on that EIR, the Regents decided not to adopt an offsite alternative for the long range development of the Lab. That decision of the Regents was upheld in *Jones v. Regents* (2010) 183 Cal.App.4th 818. With respect to the Seismic Phase II project, off-site alternatives to the proposed Project, including a Richmond Field Station alternative, were evaluated

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	Field Station.	in the Draft EIR at pages 5-1 through 5-36.
JMP-1-6	Had, Dr. Lawrence known that the scattered building which constitute the National Lab would be built there and then named for him, Dr. Lawrence might scream, "Do not take my name in vain!"	See Response to Comment JMP 1-4.
JMP-1-7	The entity of the current Lawrence Berkeley National Laboratory can do better than patch-up disparate pieces. Make a new campus in a far safer zone--both geologically at less seismic threat and for public safety personnel to be enabled to manage a buffer zone perimeter far away from residences in the event of criminal behaviours.	The comment is noted. Geological and seismic issues are analyzed in Draft EIR section 4.5, Geology and Soils, specifically pages 4.5-9 through 4.5-26, and in the Master Response on Geology. Fire and security-related impacts are analyzed in Draft EIR pages 4.11-8 and 4.11-9.
JMP-1-8	Where does LBNL stand on the Homeland Security list?	Please refer to Master Response 2, Security Issues.
JMP-1-9	Excluding Chevron facilities, where does the Richmond Field Station stand on the list?	Please refer to Master Response 2, Security Issues.
JMP-1-10	What is the potential projection for intentional destructive acts at present at LBNL?	Please refer to Master Response 2, Security Issues.
JMP-1-11	What elements are used to make such a judgement of no change?	Please refer to Master Response 2, Security Issues.
JMP-1-12	Who in DOE has made the decision that adding more and more hi profile physics advanced technology facilities with more employees, more deliveries does not "up the ante" for targeting the proposed facility for a man-made destructive act?	Please refer to Master Response 2, Security Issues.
JMP-1-13	One by one constructing new projects, impact by impact, the threat to the security of the people working on the LBNL site and people living and working close by increases doesn't it?	Please refer to Master Response 2, Security Issues.
JMP-1-14	One by one, each 'new' facility designed and constructed at LBNL is widely publicized, packaged, and metaphorically 'sold.' We would be wise to respect the advice of geologists on threats from natural forces-seismic, fire, extreme weather of rain or upsurges of geologic water, land and mudslides and even killer heat waves.	Please see response to Comment JMP-1-7, above. The Draft EIR provides analysis of issues related to seismicity (Section 4.5), hydrology (Section 4.8) on pages 4.8-16 through 4.8-33, and fire and other reasonably foreseeable hazards (Sections 4.7 on pages 4.7-16 through 4.7-35 and 4.11 on page 4.11-8). Pursuant to CEQA Guidelines Section 15145, the Draft EIR does not analyze potential events or conditions that are too speculative for evaluation, such as the Commenter's assertion about "upsurges of geologic water" and "killer heat waves."
JMP-1-15	We would be wise to learn about the potential threats from intentional de-	Please refer to Master Response 2, Security Issues.

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	structive acts by humans that our law enforcement leaders KNOW they may have to respond to. Would it be prudent to seriously asked local law enforcement leaders on how they would manage to control a destructive act at the Lab? Or a series in tandem?	
JMP-1-16	Creating a new campus site for LBNL much like UC Mission Bay in SF for medical and scientific research with a very wide protective perimeter would be a safer place to build out the 1 million square feet of new development described by Lab planners in the LRDP. Such would be seismically safer.	The comment is noted. Please see Draft EIR Chapter 5, pages 5-1 through 5-36, for the alternatives -- including off-site alternatives -- that were analyzed for the proposed Project. Seismic issues are also analyzed in Draft EIR Section 4.5, pages 4.5-9 through 4.5-25.
JMP-1-17	It could be planned in collaboration with law enforcement leaders who are well aware of the "law enforcement nightmare" that is posed by the few narrow roads serving 3 Lab. entrances. Inside, the Lab facilities are scattered on the landslide-prone terrain of Strawberry Canyon.	The comment is noted. Please see responses to Comments JMP-1-14 and JMP-1-16, above. See also analysis of police services, pages 4.11-4 through 4.11-5.
JMP-1-18	Should mud cover the road, trees or the Western Power towers fall, the limited access, egress. from the North, South and East areas would likely have to be made on foot by public safety workers. And a firestorm?	Please see Draft EIR analysis of seismic, landslide, liquefaction, and soil stability issues in section 4.5, pages 4.5-9 through 4.5-25. Draft EIR discussion of potential wildland fires and impacts to fire protection services are included in Section 4.7, pages 4.7-22 and 4.7-34 through 4.7-35, and Section 4.11, page 4.11-8.
JMP-1-19	Publicity can be a 'double-edged sword'. Human intentional destructive acts do select target of laboratories, universities and government facilities to do harm that overflows to residential neighborhoods, children's museums and schools as well as harms scientists, support staff, and even First responders.	Please refer to Master Response 2, Security Issues.
JMP-1-20	Wouldn't developing a NEW secure site accessible from the Bay Trail on foot or bicycle, a 10 minute ride from the main UC Campus or El Cerrito BART by shuttle, with other nearby public transit and acres of parking spaces solve a number of gripes that scientists express? Wouldn't they be more tranquil and feel safer to pursue their work?	The comment is noted. Please see Draft EIR Chapter 5, pages 5-1 through 5-36, for the alternatives -- including off-site alternatives -- that were analyzed for the proposed Project.
JMP-1-21	Would it be reasonable to design a new Lawrence National Laboratory with a LARGE PERIMETER that could be contained by law enforcement and other public safety personnel in the event of an intentional destructive act underway?	Please refer to Master Response 2, Security Issues.

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JMP-1-22	One could imagine that Ernest Lawrence, Andrew Lawson (1861-1952), the founder of the San Andreas Fault and even Glenn Seaborg (1912-1999) Nobel scientist and a major figure in expanding the Lab would be most pleased!!!	See Response to Comment JMP 1-4.
JMP-1-23	Crime drama scenarios with an array of 'blueprints' on destroying high tech facilities abound on nightly television and in computer games. Workplace violence at labs and universities is highlighted by news commentators every month.	Please refer to Master Response 2, Security Issues.
JMP-1-24	Although the narrative implies that present projects within LBNL on University of California land is within a secure site at present, public safety experts, criminologists and ordinary citizens who know the lay of the land of the steep Berkeley/Oakland hills, can easily see from their homes or even from a bus or car window that LBNL has no buffer zone for security of the facility. It has a fence that anyone can crawl under, residential neighbors and a patchwork of security systems at various buildings. This proposed project will not be reasonably protected from Intentional Destructive Acts by humans more than any other building at the Lab. For another project, a description of a fence and controlled access at 3 entry gates with key and keypad for entry to the project site in the context of the existing security system in place is justified as 'secure' yet we know such an assertion is untrue; for years our exploring children short-cut their way through the Lab as they go uphill to the Lawrence Science Museum.	Please refer to Master Response 2, Security Issues.
JMP-1-25	We would all be wise to respect the land and groundwater, the faults that are expected by scientists to be faulting and to seek alternative sites to construct experimental laboratories in secure flat land with a wide buffer zone to protect the public from accidental and intentional releases of radioactive and toxic emissions.	The Draft EIR includes analyses of issues related to land use (Section 4.9, pages 4.9-9 through 4.9-15), groundwater (Section 4.8, pages 4.8-20 through 4.8-21 and pages 4.8-27 through 4.8-28), seismicity (Section 4.5, pages 4.5-9 through 4.5-19), hazards and hazardous emissions (Section 4.7, pages 4.7-16 through 4.7-22 and 4.7-24 through 4.7-32), police protective services (Section 4.11, pages 4.11-4 through 4.11-5 and page 4.11-9), and alternatives (Chapter 5).
JMP-1-26	Creating a new campus site for LBNL much like UC Mission Bay in SF for medical and scientific research with a very wide protective perimeter would be a far safer place to build out the 1 million square feet of new development	Please see Draft EIR Chapter 5, pages 5-1 through 5-36, for analysis of alternatives, including off-site alternatives. Please see Draft EIR Section 4.7, pages 4.7-24 through 4.7-36, for analysis of hazards and Section 4.11, page 4.11-9, for

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	described by Lab planners in the LRDP.	analysis of police protective services. It should be noted that, with the inclusion of demolition and infill development, LBNL's 2006 Long Range Development Plan EIR projects a net increase in approximately 660,000 gross square feet over the 20-year planning period.
JMP-1-27	Experiments in physics are worthwhile, beneficial and deserving of safe facilities for scientists, visiting scholars, students and support staff to work in. Please honor Dr. Lawrence's legacy!	The comment is noted. Please see response to Comment JMP-1-4, above.
JMP-2-1	This letter is a duplicate of JMP-1	Responses to comments JMP-1-1 through JMP-1-27 apply equally to Comment letter JMP-2.
BR-1	Comments on D.E.I.R., Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase 2. Thank you for sending me a copy of the report. It is a large thick document, but nicely done. It would be an impossibility to comment on the document without having it in hand, so I do thank you for that.	The comment is noted.
BR-2	In the future I think that it is imperative that you order copies enough for all interested and affected citizens. Also, I personally received a letter informing me of both the document and the public comment session, and that was helpful. I do wonder how many of these letters were sent out, and whether this information was available widely, or only to a few of us who had previously commented on other LBNL projects.	In keeping with current UC LBNL practices and in accordance with CEQA, the University makes its Berkeley Lab EIRs available in the following ways: Notices of Availability are sent to a large mailing list of concerned agencies, groups, neighbors, and citizens. The State Clearinghouse is provided with information to post as well as several EIR copies for State and Regional agencies. Advertisements are typically run in local newspapers. Any member of the public who requests one is immediately mailed a CD version of the EIR. In addition, two EIR hard copies are posted in the Berkeley public library, and an electronic version is posted on the Lab's website for viewing or downloading. In addition, consistent with UC practice, Draft EIRs are presented and described in public hearings, where any interested member of the public may attend and offer comments that will be recorded and responded to in the Final EIR.
BR-3	Also: If this document is only a CEQA document, how will citizens be able to comment on the NEPA document? Please forward to me the NEPA document as it becomes available. p.1-2 I also request a copy of the final EIR for this project. p.1-4	When the Department of Energy (DOE) completes its Draft EA, it will make it available for public review. The University will notify DOE that the Commenter requests to receive the EA. The University also notes that the Commenter requests to receive a copy of the Final EIR, and a copy will be provided.

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BR-4	Perhaps what is called for in the way of Draft E.I.R. comments are specific questions such as: The map on p. 3-4 shows the buildings of the LBNL but it fails to show any part of Berkeley that citizens may be familiar with, because all of the area shown is off-limits to us. Is Blackberry Gate the one at the top of Hearst Avenue? Could Hearst Avenue and Centennial Drive please be labelled? "Old Town" is mentioned in the text, but it is not labelled on the map.	The comment is noted. Figure 3-2 of the DEIR will be revised to show labels for Centennial Drive, which leads to the Strawberry Gate, and Cyclotron Road/Hearst Avenue, which leads to the Blackberry Gate. On pages 2-1 and 3-6, the DEIR states that Old Town is located at the center of the LBNL main hill site, and its precise location is shown on Figure 4.0-1 of the DEIR. Figure 3-2, entitled Project Components, shows only components of the proposed Seismic Phase 2 project. As other Old Town structures are approved for demolition as part of a separate, concurrent project at LBNL and as their demolition is not a component of the proposed Seismic Phase 2 project, they are not shown on Figure 3-2.
BR-5	Instead, again and again as I read your Draft E.I.R., I am compelled to say only that: No further construction should take place upon the Hill.	The comment is noted; however, this comment does not address the adequacy of the DEIR, so no response is necessary.
BR-6	The Regents are scheduled to consider the Final E.I.R. and they will have the document in hand for 10 days prior to their decision. This is hard for me to understand.	The Regents will have the Final EIR and other materials related to the EIR and the Project at least ten days in advance of meeting to consider the project. The ten days listed is the minimum amount of time recommended under CEQA for the public and other agencies to have access to the Final EIR and responses to comments prior to The Regents' meeting.
BR-7	Will the Final E.I.R. be available to me by that time? Will our public comments be included in the Final E.I.R. or will they just be summarized as they were on p. 2-2.C, "Areas of Controversy".	The comment asks whether the Final EIR will be available to the public 10 days prior to the Regents' meeting and whether public comments will be included in the Final EIR. The Final EIR will be available on the LBNL Community Relations website as of Monday June 21, 2010. Library copies of the Final EIR will also be available as of Friday June 25, 2010 ahead of the Regents' meeting on July 13, 2010.
BR-8	This present Draft E.I.R. is an interesting document, an improvement over several previous LBNL EIRs. The photographs and maps are clear, and the writing is well done. That leads to the question of the total cost of preparing the document.	The comment is noted. The total cost of preparing the EIR includes work on the Final EIR, and cannot be known until after the Final EIR is completed. UC LBNL staff would be pleased to respond to this question after the Final EIR is prepared, if the commenter needs further information.
BR-9	It has been said to me that copies of the report are too costly for distribution to the public. But that is the purpose of it! Surely the cost to prepare the	Please see response to Comment BR-2, above. The University and UC LBNL are committed to providing convenient public access to its CEQA documents

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	document far out-weighs the cost of the copies. The Lab needs to provide copies in response to honest requests. It is much too large and comprehensive a document to be able to be reviewed in a limited library setting. Look at the expense of providing copies this way: The average worker preparing the document earns X dollars per hour. We who are reviewing the document and writing comments are similarly putting in an equal effort. You do not pay us. But you should at least contribute enough dollars to our efforts so that we can be provided with the document necessary for our work on it.	while maintaining responsible stewardship of environmental and public resources. Accordingly, the University provides CDs, on-line access, and library copies of its CEQA documents to the public. The commenter was provided with a hard copy of the document, as noted in the introduction to his comments.
BR-10	"The Project aims to provide seismically safe facilities ... replacing the demolished space.... built to higher seismic safety standards" p1-1.A. The problem here is that the site chosen is basically <u>NOT</u> seismically safe. It is wishful thinking to believe that a structure, however new and wanted, will ever be actually 'seismically safe' when the Hayward fault ruptures. Your employees there will be given a false sense of security, but because of the location of the project, will actually still be in danger. The other problem is that, in order to strive for seismic safety in a basically unsafe location, larger amounts of money will be required - and that is our money, our taxes that are being spent to engineer this building; more money than if the buildings were located in a safer area.	The project would be designed and constructed in accordance with the requirements of the California Building Code and UC Seismic Policy. Additionally, the recommendations of the expert geotechnical reports commissioned for the proposed project would be implemented. As such, associate geologic risks would be less than significant. See also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site, and the analysis in the Draft EIR Geology and Soils Section, pages 4.5-16 through 4.5-26.
BR-11	"Construction of the efficient new building will allow LBNL to vacate 36,000 gsf. of off-site leased space". p.1-5 The problem is that instead of moving Lab activities away from this unstable and unsuitable area, plans are being made to move yet more people and activities in. This should not be done, in my opinion. If an un-safe building needs to be demolished, then do so in a safe way, but do not build additional buildings, whether you consider them to be "replacement" buildings or not.	The comment is noted; however, modifications to the proposed project now mean that fewer personnel would relocate to the main hill site from off-site locations. Please see Chapter 3 of the Final EIR. Also, regarding geologic conditions at LBNL, please see response to Comment GC-14 and Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
BR-12	Cumulative Impacts p.2-9.F. The combination of projects listed for the LBNL site along with those listed for the U.C. Campus is staggering in both number and size. As a citizen of Berkeley with some hope of being able to continue living here, it is clear	The DEIR identifies the amount of development proposed under the LBNL 2006 LRDP (page 4.9-3) and the UC 2020 LRDP (pages 4.9-6 and 4.9-7). In conformance with CEQA, potential cumulative impacts related to this development have been identified and duly analyzed throughout the DEIR. No further response is necessary.

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	after reading these lists of projects that either quality of life will be seriously compromised, or that in a matter of time these two agencies will continue to encroach on previously privately-owned property like a huge tsunami until there is nothing else left: just a gigantic monolithic U.C./LBNL Complex from one end of the city to the other, and no one left to pay the sewage and infrastructure bills.	
BR-13	To say that "an additional number of vehicles may possibly create need for a traffic signal" is to completely miss the impacts of this enormous building frenzy.	As described in Chapter 3 of the Final EIR, the proposed project as modified would result in only a negligible increase in the average daily population (ADP) of the LBNL main hill site and no additional vehicle commute trips. Therefore the project would not contribute to significant, unavoidable traffic impacts at intersections on local roadways in the vicinity of LBNL.
BR-14	I'm thinking that nowadays U.C. might better stand for the "University of Construction" or the "University of Cranes." Everywhere one goes, one is likely to find a construction fence along with a sign "No Pedestrian Access." This is a great inconvenience to pedestrians, who then have to cross two additional streets to continue on their way. These barricades seems [sic] to be erected in a quite off-hand manner. Had the barrier been across a vehicle route, I'm sure arrangements would be made to accomodate the vehicles: not so with pedestrians. The most egregious example of this is on Hearst Avenue, where a barrier to pedestrian access has been in place for years.	The Seismic Phase 2 project does not propose any construction on local roadways in the vicinity of LBNL or UC Berkeley, including Hearst Avenue. However, concerns regarding impacts to pedestrian access during UC construction projects may be directed to the UC Berkeley Office of Local Government and Community Relations. 200 California Hall, MC#1500 University of California Berkeley, CA 94720-1500 http://office.chancellor.berkeley.edu/gcr/local.shtml
BR-15	It also blocks one lane of street traffic, and my observation has been that the blocked off area is used only to accommodate the personal vehicles of construction workers, in other words, a parking lot. Yet it is Hearst Avenue which is always designated as the route of choice for demolition and construction materials for LBNL. I would like to see this matter of the blocked-off lanes and side walk on Hearst Avenue specifically addressed in your E.I.R.	As noted in response to Comment BR-14, the Seismic Phase 2 project does not propose any construction on local roadways in the vicinity of LBNL or UC Berkeley, including Hearst Avenue. However, concerns regarding impacts to pedestrian access during UC construction projects may be directed to the UC Berkeley Office of Local Government and Community Relations. Please see response to Comment BR-14.
BR-16	4.5 Geology and Soils Potential Project Impacts 4.5-16 I have to disagree with your decision to label these projects as "less than	The DEIR describes the soil condition as noted by the comment, and provides a description of how the condition is addressed through building foundation design, structural design, and slope stabilization techniques. The design process is conducted by a team of structural engineers, geotechnical engineers, and

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	significant" as regarding the risks involved. Section 4.5-15 discusses the soil types (unstable), the slope of the land (30, 50, 75% slopes), and the erosion (by which I suppose you mean 'landslide') potential (highly susceptible). From reading the soils analysis section I would think that the impact of buildings on this site would pose 'extremely high significance' risks. I know this also from my own knowledge of the area surrounding the LBNL fence-line. It almost seems like LBNL has not read its own report at all. Perhaps there is a hope that no one notices that some crucial items have been deemed to be "unimportant." The manner in which Section 4.5-16 so casually dismisses very important matters, casts doubt on the verity of the entire Draft E.I.R.	architects using the best available technology to reduce risks to acceptable levels, as defined by the Uniform Building Code. Demonstrated conformance with Code requirements reduces the impact to less than significant levels. See also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
BR-17	This opens up several possibilities for the inquiring citizen to ponder: 1. If the Lab receives a major part of its funding from the tax-payers in one form or another, LBNL's cavalier assessment of the risks may stem from the belief that, should anything happen to the Lab from soil-creep, landslides, earthquakes and so on, that the tax-payers would pay for a re-build, or that the tax-paying citizens assume the risk for the LBNL management.	The University respectfully disagrees with the statements in this comment. The EIR contains a detailed analysis of seismic safety issues, and includes mitigation measures to avoid associated significant impacts. Please see Chapter 4.5 of the Draft EIR.
	2. The responsible administrators need to look at the fact that any new buildings, and any older buildings already on the site, might be destroyed and that it could mean the end of LBNL. Because individual administrators would apparently not bear the risks of their unfortunate decisions to build on unsuitable locations, they are exposing tax-payers and the neighboring community to the risks, including the environmental hazards LBNL would leave behind, should the facility collapse or slide away downhill. The administrators who made the bad decisions could walk away free and move on to jobs elsewhere.	Discussion and analysis of seismic and soil stability issues are included in Draft EIR Section 4.5, pages 4.5-16 through 4.5-26. The proposed Project seeks to avoid the sorts of risks posed by the Commenter, as articulated in its Project Objectives discussion (Draft EIR pp. 1-4 and 1-5). Moreover, the No Project Alternative would maintain "…the status quo, which keeps LBNL personnel in buildings that have a poor seismic rating exposing them to potential life safety hazards. Building 85/85A is now known to be located on two ancient landslides. These landslides are considered stable except possibly in the case of a severe earthquake, when they could move. Under the No Project Alternative, Building 85/85A would continue to have risk of potential building damage in severe earthquakes." (Draft EIR p. 5-33). See also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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BR-18	Sec 4.5-16.D. 4.5-9. There are known faults in our area. We can certainly all expect some future shaking from more than one of them, but to continue to place major building projects so near to the Hayward Fault is completely irresponsible. The likely-hood of extreme shaking, liquefaction, land-sliding and rupture is so great that the well-informed prudent person would designate the whole of steep Strawberry Canyon as a nature preserve. This would also benefit the tens of thousands of students and faculty of the U.C.B. campus.	Please see Draft EIR Section 4.5, pages 4.5-16 to 4.5-26, for analysis of risks due to seismicity, liquefaction, landslides, and soil stability.
BR-19	It seems that self-interest, along with lack of planning, has allowed individuals or groups to parcel off selected sites in Strawberry Canyon ... because it is "close to the University campus and folks like to go back and forth easily." This arguement [sic] does not hold sway with the public at all.	The source of the Commenter's quote is not clear, but it does not appear to be from the Project EIR. Moreover, the proposed GPL is not located in Strawberry Canyon. The comment is noted.
BR-20	Sec. 4.5-8 addresses the issues of alternative practices very well: 1. "Avoid construction on known faults or landslides..." 2. "Discourage development on slopes..." 3. "Utilize lands subject to severe seismic and geologic hazards for low intensity park and recreational activities or open space." 4. "Not locate public facilities for human occupancy in fault zone areas..."	The comment is noted. No further response needed.
BR-21	3-17.6 "Official State of California Earth-quake Induced Landslide Hazard zone:" "A system of below-grade pier foundations and tie-backs, and additional bracing and girders, metal casings and concrete..." is the engineering solution to the problem, but it overlooks the common-sense solution, which is not to build there.	The comment is noted. Analysis of a No Project Alternative is included in Draft EIR Chapter 5, pages 5-33 through 5-35.
BR-22	Modern new buildings' and 'seismic strengthening' and 'vista corridors' and 'food services' just make the situation worse. No more building should be done on the Hill. Buildings, as they become obsolete or hazardous should be removed or encased in place, working toward the goal of eventually restoring the hillside to its natural state. A new type of thinking will be required.	The comment is noted. Please see LBNL's 2006 Long Range Development Plan (LRDP) and 2006 LRDP EIR for description and analysis of long-range planning and development at the LBNL main hill site.

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BR-23	There is an honesty in this E.I.R. that was not present in some previous LBNL documents: Sec. 4.1-5 states: "LBNL is located on a steep hillside…" "the built environment is a result of 'as-needed' construction… pathways encroach on service areas… box-like grey metallic structures…"	The comment is noted.
BR-24	These descriptions should give LBNL itself pause. 1. The first building was built to accommodate secret WWII project… 2. Additional projects in ever-increasing amounts… 3. Buildings erected in haphazard fashion… 4. The real reason buildings are added is that it is close to campus. 5. The land is owned by U.C. 6. Science can attract funds. 7. A combination of professors and their experiments; graduate students looking for experience with pay and leading to advanced degrees But the whole thing is based on a house of cards - the location is not suitable!	The comment is noted. Project locations are described in Draft EIR Chapter 3.
BR-25	Fig. 3-5, an aerial view of Building 25 complex, though a lovely photograph, is scary in the extreme when it is then possible for an ordinary citizen to view the city that has been constructed up there in that canyon. From WWII onward, construction apparently has just never stopped. It is the ever-increasing number and size of the buildings that concerns me, …	The comment is noted. The history, patterns, and future of general development at LBNL are described and analyzed in the 2006 Long Range Development Plan (LRDP) and 2006 LRDP EIR.
BR-26	… along with the contamination of the environment and the potentially hazardous nature of the experiments being carried on there. The toxic legacy of all this activity has left its mark on not only the soil of the LBNL, but on the ground-water and the surface water which is shared by all. Strawberry Creek drains the canyon but then flows thru the City of Berkeley and into the bay. U.C. students doing projects in the creek are instructed to wear protective equipment before touching the water of the creek. And yet the U.C. site was originally selected because of the abundant fresh-water springs suitable for drinking water! What has happened up there?	Please note that the recommendation by UC to wear protective clothing in Strawberry Creek is not due to toxic contaminants but to the potential presence of harmful microorganisms that may be present in all natural creeks. The UC publication "Enjoying Strawberry Creek Safely" states the following: "WATER QUALITY—SEWAGE AND OTHER POLLUTANTS - A variety of potentially harmful microorganisms (bacteria, viruses, and protozoa) can live in "natural" surface waters such as streams, lakes, and rivers. Even though the water may look clear and clean, some invisible microorganisms, such as Cryptosporidium and Giardia, may lurk there and cause illness in humans if swallowed." UC LBNL regularly monitors chemical constituents in creeks flowing offsite and the levels are not hazardous. These results are reported each

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		year in the Lab's Site Environmental Report. As for groundwater contamination, UC LBNL is cleaning up the groundwater under the regulatory authority of the California Department of Toxic Substances Control. The long-term goal is to restore all groundwater at the site to drinking water standards, if practicable, even though the groundwater is not used as a source of drinking water. Please see Draft EIR Chapter 4.8 for an analysis of hydrology and water quality at the project site.
BR-27	4.0-2 3. "The proposed project would result in re-location of approximately 100 U.C. L.B.N.L. personnel from a site on Potter Street to the L.B.N.L. main campus." I believe that people should be re-located in the other direction: OFF the L.B.N.L. hill site.	The comment is noted. Please see Draft EIR Chapter 5, pages 5-25 through 5-29, for discussion of off-site alternatives.
BR-28	4.0-4 to 4.0-10. Projects on the LBNL Site. These pages list the 15 major projects proposed or underway. Each of these projects individually is huge, and the cumulative impact of them all is far in excess of the area's cumulative ability to bear them. The cumulative impacts are too great for the city to bear; too great for the citizens and neighbors to bear; too great for the tax-payers ability to fund; too great for the area and type of site; and too great for the infrastructure, traffic, noise, dust, utilities, safety, sunlight, views, scenic vistas, land-fills and all else listed in your D.E.I.R. The cumulative impacts are immense. They are not 'less than significant' in any way.	The comment is noted. The cumulative effects of the proposed project in combination with other reasonably foreseeable development in the surrounding area are analyzed in detail in Chapters 4.0 through 4.13 of the Draft EIR. As described in Chapter 2 of the Final EIR, no significant cumulative impacts were found. Additionally, please see the LBNL 2006 Long Range Development Plan (LRDP) and 2006 LRDP EIR for a description and analysis of possible growth under the 2006 LRDP.
BR-29	The Phase II General Purpose Laboratory Project seems not to carry as many negative aspects as some of the other previously proposed LBNL projects. However it represents yet another construction project and building cluster on the hillside. In section after section the report statues "oh, we'll plant tress," or "we'll cover the debris trucks" or "we will re-locate any	The comment is noted. Please refer to Draft EIR Chapter 3, pages 3-21 to 3-23, and Sections 4.2, pages 4.2-12 through 4.2-16, and 4.7, pages 4.7-16 through 4.7-20, for descriptions of potential toxins and other hazards associated with the General Purpose Lab; Section 4.5, pages 4.5-9 through 4.5-24, for discussion and analysis of slope stability; and Section 4.12, pages 4.12-14 through 4.12-22,

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	whipsnakes we find", and that can lead the casual reader to believe that all is well on the hill. But it is far from an acceptable outcome for the area and the citizenry as a whole. The hillside already is much too congested for safety, being a large, quite possibly toxic experimental complex situated on a dangerous, steep, unstable hillside location. Relocating a whipsnake or wetting down construction dust sounds lovely, but it obscures the larger overall problem.	for discussion of traffic circulation. Please see also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
BR-30	Addendum to my comments. 10 am 15 March 2010 I have just called Mr. Mark Chekal-Bain, the Community Relations Director at LBNL, to inquire about the best method to submit my comments, today being the due date... only to be informed that Mr. Checkal-Bain is no longer employed at the Lab, his last day being Friday. Yet it was he whose card is attached to my copy of the Draft EIR, and he, along with Mr. Jeff Philliber, who presided over the public comment period on Feb. 25. As far as I know, no one has had any fore-warning about this change in personnel. I have had several questions answered by Mr. Chekal-Bain in the past, and I wonder if the answers I got from Mr. Chekal-Bain will still be valid. So often in the past, when dealing with institutions, one employee will give one answer, while a subsequent person will deny knowledge of that and instead will come up with something quite different. I hope that will not be the case at LBNL. This abrupt change in Community Relations Directorship just re-enforces my opinion that institutional employees come and go, and that their own priorities may take precedence over the long-term well-being of the community as a whole.	The Community Relations function performed by the individual who previously staffed it continues to be carried out by UC LBNL's Public and Intergovernmental Affairs Department. This includes interactions with the public who are engaged in the Seismic Phase 2 Project CEQA process.
JB-1	Dear Dr. Alivisatos: I am alarmed by LBNL's plan to put 660,000 more gsf of Lab buildings on top of a collapsed volcano (caldera).	This comment does not directly reference the proposed project or the adequacy of the EIR. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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JB-2	Neither the caldera nor the slides of 1974, originating in a water-filled cavity of the caldera, are mentioned in the LRDP or the Seismic Safety 2 DEIR.	Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
JB-3	In the event of the predicted major earthquake on the Hayward Fault, Lab buildings may be destroyed, as well as take the lives of many who live and work below on the UC campus and in the community.	Construction will be performed in accordance with the California Building Code and University of California Seismic Safety Policy. Please see response to Comment GC-14. Please see also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
JB-4	Also, the Hazardous Materials Facility (see DEIR), above the Botanical Garden and Strawberry Creek, should be removed before the earthquake event.	The comment is noted. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site, and also DEIR Section 1.D - Project Objectives.
JB-5	The geology of LBNL's campus is extremely unstable, unfit for further construction.	Regarding the geology of the LBNL main hill site, please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site. Only certain portions of LBNL are within the State-defined seismic hazards zones, and the investigations performed for the Building 85/85A seismic upgrade and GPL construction were conducted in strict accordance with applicable State regulations and guidelines expressly designed to protect public safety. All improvements shall be in strict accordance with California Building Code and other applicable seismic regulations.
PH-1	Title Page and opening presentations. During Jeff Philliber's presentation: * On pages 12, 13, 15 - an unidentified speaker had questions about the CEQA and NEPA processes. * On pages 15, 16 - Ms. Sihvola had questions about the NEPA process. Questions responded to by Mr. Philliber at that time (see Reporter's Transcript of Proceedings). During Mark Chekal-Bain's explanation of procedures: * On page 18 - an unidentified speaker had a question about the public hearing procedures. Question responded to by Mr. Chekal-Bain at that time (see Reporter's Transcript of Proceedings).	This comment is a transcription of introductions and general discussion at the February 25, 2009 public hearing. This comment does not address environmental issues or the adequacy of the DEIR, so no response is necessary.

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PH-2	My name is Susan Samson. Although I come here as a 45-year Berkeley resident who has witnessed many changes in our community. I come here primarily as a science advocate. I am involved with the UCSF program. I am here to address a critical issue between my role as an advocate striving to define the promises and transportation of the Genomics Medicine Initiative, how the seismic life-safety replacement of general purpose buildings can benefit the community and more effectively influence innovation in the life sciences. I actually bring to the table voices of many people who share the core belief that the Berkeley Academy of Sciences has boldness, vision and a sense of urgency. Many have argued that the next century of scientific technological innovations will be most profound in life sciences, and, as Joe mentioned, bringing state-of-the-art measurement to address the critical problems of our time. LBNL holds a critical role in improving the research process for selected cancers and focuses on systems and biologic approaches to highlight mechanisms that influence individual responses to therapies. Powerful genotyping tools have allowed LBNL researchers to assemble information about gene abnormalities in breast cancer through genotyping tools that provide biomarkers. Researchers will detect metastases from breast cancers before they are metastasized. This work contributes to all our well being, and LBNL must continue to take a leadership role. However, although LBNL is poised to do great things in this emerging age of personalized medicine, it can only do so if its research needs are met. The new seismically-safe modern building will improve efficiency and consolidate functions and will create a lifestyle that will ultimately help, for example, or accelerate the understanding of the molecular basis of cancer through the application of geno-analysis technology. I am pleased that the	The comment introduces the speaker's background and expresses support for life science research work conducted at LBNL as well as for the proposed GPL. This comment does not address the adequacy of the DEIR, so no response is necessary.

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	serious consideration about how to address scientific and practical challenges including traffic impacts is beginning now. I thank you for your attention.	
PH-3	Is there any way I can turn to address the audience? There is about twenty of us back here. I don't know what you look like, but I know what your back looks like. And I would also like a place to rest my document, if possible. MR. CHEKAL-BAIN: The reason we do it this way is we are actually the agency, if you will. Put the microphone up and let her speak from there. MR. PHILLIBER: If she speaks into the microphone everyone should hear. Put the microphone over there. MR. PHILLIBER: We will make sure everyone can hear. If you like we can hold the document for you. It is not a big deal. This is our meeting, guys. MR. PHILLIBER: We are going to go ahead and continue. This is the way we always do it. We are the audience. MR. CHEKAL-BAIN: We are going to go forward.	The commenter asks if she can face the members of the public to speak, but Mr. Chekal-Bain explains she needs to address the lead agency. The commenter then remarks on the placement of the microphone. This comment does not address the adequacy of the DEIR, so no response is necessary.
PH-4	Well, first I want to thank you for your document I received. It is, indeed, a beautiful document. I don't know how many of you have seen this. One of my concerns is whether the people that really would be interested in this or affected by this would be aware that this meeting is taking place and there is documents available. So thank you for listening.	The comment is noted. No further response is necessary.
PH-5	And then to address the subject matter of the document, I would say LBNL wants to put more buildings up in Strawberry Canyon, and the fact that it is a canyon should give you folks pause because it is not the place that you	Please refer to Draft EIR Figures 3-5 (Aerial View of Building 25 Complex) and 3-6 (GPL at Building 25 Site). This aerial photograph and contour map show that the proposed GPL site is relatively flat and not at all “steeply sloped.”

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	want to put a lot of buildings. A canyon really implies steepness, which you have up there,	
PH-6	... and we know that not only is the Hayward fault nearby, but it is very -- a lot of landslides have happened, and they are going to be happening.	Please see response to Comment GC-14 and Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
PH-7	And then to avoid that in order to build the building that has a chance of being safe up there you are pouring a lot of money into reinforcing the foundation, which is basically taxpayer money. So we might better be spending it on reinforcing our own foundations.	The comment is noted; however, this comment does not address the adequacy of the DEIR, so no response is necessary.
PH-8	But it is going to build evermore buildings on the hillside, which is hazardous.	Please see Draft EIR Section 4.5, pages 4.5-16 to 4.5-25, for analysis of risks due to seismicity, liquefaction, landslides, and soil stability, and Section 4.7, pages 4.7-16 through 4.7-36, for discussion and analysis of potential hazards. See also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site
PH-9	So looking at the historical part of why the University was even located up where it is because there is a multitude of springs up in Strawberry Canyon. The idea was that they were supposed to get their water from that supply. So as you fill the canyon with parking lots and buildings and so forth you know there is going to be water there.	For a discussion of springs at the LBNL main hill site, please see response to Comment CMTW-9.
PH-10	So in the past there has been landslides, and there has been a well built to rid the area of water accumulating. That water slides down into Strawberry Creek, goes through the campus.	The comment is noted. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site
PH-11	I know the campus has got restriction in case anybody wants to do a project in Strawberry Canyon, they advise waist-waders and rubber gloves. So that is not totally (inaudible) water that is being pumped out of the Canyon.	Please see response to Comment BR-26.
PH-12	So there are many reasons why I think that the University and the Lab and the DOE, whoever is involved, should not be putting more structures up in the Canyon. I think when you talk about collaboration that is not really as significant as the fact that if you should be -- if you are going to demolish anything at all, you should be moving out of the Canyon to other locations if there are, indeed, other locations.	Please refer to Draft EIR Chapter 5, pages 5-1 through 5-36, for description and analysis of Project alternatives, including off-site alternatives.
PH-13	I am Gene Bernardi of the Committee to Minimize Toxic Waste. And I wish to address the so-called seismic safety plan for the hazardous waste-handling facility. Replacement of the hazardous waste-handling facility, of	The comment is noted; however, the siting, construction, and operation of the Hazardous Waste Handling Facility (HWHF) is outside the scope of this Project and EIR.

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	the replacement of hazardous waste facilities, which is replacing existing hazardous waste, should never have been built in its presents location situated behind Lawrence Berkeley Lab's east gate on the Wildcat fault, which area is in the City of Oakland. In order to build this non-nuclear facility for the storage of radioactive and hazardous waste, it was necessary to do at least four things, one, ignore the Wildcat fault. Two, ignore the safety implications of slope stability problems. Three, failed to do a supplementary EIR when two major changes were made to the original EIR, namely, building a non-nuclear facility for storage of radioactive and hazardous waste and moving the fence-line a considerable distance from the existing fence-line around the hazardous waste-handling facility. So, first of all, it was built on the Wildcat fault. They were aware of this, if not under their own knowledge but through public comments. They ignored the safety implications of slopes' building problems, this despite number one, the Lab's own revelation in response to public comments IS-7, which indicated that a slide 50 feet long by 100 feet wide occurred along the access road to the side of the replacement facility in the winter of 1994, '95. That is not ancient, which is what I heard a few moments ago. And, number two, the knowledge provided in public comment of the University of California press release that reported that Centennial Drive, which connects to the access road which the handling facility was closed for eight months in 1993 and 1994 due to a huge slide, again, not ancient. Three, failure to do a supplementary EIR when two major changes were made to the original EIR, first building a non-nuclear facility for storage of radioactive hazardous waste because the Department of Energy's western division, quote, determined that the benefits of constructing a nuclear facility do not justify the additional cost, unquote. Surely a nuclear facility has more safety features than a non-nuclear facility. Is safety not worth the cost? In order to fall below the threshold for cate-	Nevertheless, for the purpose of clarification, please note that Building 85/85A is not situated on the Wildcat fault. The Wildcat fault is located several hundred feet east of Building 85/85A. Please see response to comment GB-2. In addition, the Wildcat fault is neither considered to be nor zoned as an active fault. Please see DEIR pages 4.5-11 through 4.5-17. Furthermore, the location of the slides referred to by the commenter do not intersect or underlie any portion of the Building 85/85A facility. These slides are relatively shallow and are different than the deeper “ancient” landslide deposits referred to by commenter. Therefore, the Wildcat fault has not been ignored; it does not significantly affect Building 85/85A due to its location and absence of activity. Moreover, the objective of the proposed project is to address slope stability concerns associated with Building 85/85A.

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	gory 3 non-reactor nuclear facilities --	
PH-14	I am Dr. Georgia Wright, a member of Save Strawberry Canyon. And I would like to point out that the objectives for this seismic safety phase two begin with to provide a safe modern scientific, et cetera. Thereafter if we look at some of the findings in your appendix, it certainly looks as though all of the "safe" business has just been brushed under the rug.	The comment is noted; however, UC LBNL respectfully disagrees. Safety is analyzed and addressed throughout the Draft EIR.
PH-15	I have been reading those geotech reports, and there are astonishingly huge trenches collapsing because they were 15 feet tall and full of mud, just clay. There were very few real deep sampling core samples taken. And with the shallow trenches that were made, even the 50 feet ones ran into nothing but junk conglomerates, andesite, basalt, different volcanic stones. What they call bedrock is probably only individual stones. We know about that in this area of Berkeley. For example, if you got to the bottom of a creek and you decided to call an engineer and see if you can make your foundations, he may find a nice place to put the foundation. You start putting it in two feet away and you hit a rock, so this is just messy stuff.	UC LBNL is uncertain as to which specific reports are being referred to; no trench collapses occurred in recent investigations performed for Building 85/85A or the GPL. UC LBNL is aware that stability problems were noted in trenches excavated prior to the construction of Building 85/85A, occurring (as the comment suggests) in near-surface soil that was wet. Investigations performed for the GPL and Building 85/85A projects included deep borings that were sampled continuously. The core samples obtained include volcanic and sedimentary rocks. Materials were classified as bedrock on the basis of a thorough geologic review. Please see also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
PH-16	And yet you want to talk about new instrumentation and a safe environment, paying no attention to the costs that will be at least one-third higher if you are building in the hills in order to strengthen this and in the event of the earthquake, which is due in -- is overdue now, which will be something like 6.7. And this is admitted in your report. There will be great loss of taxpayer money and of life as landslides and buildings collapse on the buildings below. Thank you.	The project would be designed and constructed in accordance with the requirements of the California Building Code and UC Seismic Policy. Additionally, the recommendations of the expert geotechnical reports commissioned for the proposed project would be implemented. See also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
PH-17	My name is Garniss Curtis. I am concerned about the danger of the Hayward fault with respect to the buildings on the hill, Lawrence Berkeley Lab, and people, students in the Foothill housing and Stern housing. The material on the hill is resting on soft material with large blocks of (inaudible) lava in it. And the contact on this side goes from the south end of the botanic garden in a curve back to the Cyclotron and around to Shasta Road closing	UC LBNL recognizes the potential hazards associated with the Hayward fault and views seismic safety as a central concern. UC LBNL is proactively improving the safety of its facilities through projects (such as the GPL and at Building 85/85A) which are investigated and designed in accordance with the latest regulations, guidelines and codes.

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	up an (inaudible) circle that suggests a large crater. The blocks that we see in that, large blocks of andesite are standing on end. They clearly indicate that something collapsed into a big hole, probably a caldera. And then it filled with water so that sediments were deposited on top of this. But these blocks had different positions, left large voids which were filled with water and, in fact, Berkeley, in the early days got its water from these voids until they -- until the -- they used up all theirs.	The geologic interpretations posited by Dr. Curtis are, in general, not supported by the onsite data. Hundreds of borings have been drilled for projects and environmental restoration activities at LBNL. Data from these borings substantially refute the assertion that "the hill is resting on soft material" and that there are "large voids" present beneath the areas occupied by LBNL. See also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site. UC LBNL recognizes that UC Berkeley once obtained water from springs in the hills (including many in the area that is now LBNL). Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
	So when Ben Leonard studied this with John Shively, they drew a (inaudible) in to see if they can tap one of these big things. And they did tap it. I was there when he was getting 400 gallons a minute from the side (inaudible), and then things collapsed. So then they drilled a vertical hole, and they took out 14 to 16 million gallons of water in 10 years. This is water that is trapped between the fault blocks, this collapsed Calderas. And this is what most of the hill is built on. On the west side where the (inaudible) boundary comes around, the sediments of shale are dipping westward. They are rising at a centimeter per year, the same rate that the Hayward fault is moving. We are told the Hayward fault will have a 65 percent chance of a major earthquake in -- before 2032. And things are going to look very bad after that. Thank you.	UC LBNL understands that the horizontal drains and vertical well referred to by the commenter yielded significant quantities of water. This was/is not unexpected. These subsurface drainage facilities were installed within fractured volcanic rock that is shown on regional geologic maps as part of a regional syncline (U-shaped geologic structure). This structure has been frequently cited as the source of various natural springs. In past correspondence, Ben Lennert characterized the structure into which these drainage holes were drilled as a syncline (and not a collapsed caldera). This structure underlies the ridge between the upper portions of Chicken Creek and East Canyons, but is absent throughout most of LBNL. Onsite borehole data indicates that the sediments of shale referred to by the commenter do not uniformly dip westward (i.e. out of slope). Based on geodetic studies, the Berkeley Hills are thought to be currently experiencing uplift at a rate of up to about 1mm/year, not 1cm/year (Graymer 2000). The USGS considers the probability of at least one magnitude 6.7 or larger earthquake occurring on the Hayward fault before 2036 to be 31 percent, not 65 percent.
PH-18	I am John Shively. I am an engineer. And I was an engineer -- I was a campus principle engineer in 1974 when I got a call from the Lab telling me that	The slides previously referred to by the commenter are not proximate to the GPL or Building 85/85A. Based on a review of historic photographs that ex-

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	there was an major slide going on, and we needed to come address it because part of the slide was not on LBNL's property at that time. So I called the engineer, B.J. Leonard, the civil engineer, and he came and showed up, and we went up to the Lab. And at that time the slide over on the west side below Lawrence Hall of Science was very active, was sliding down, had broken the road inside LBNL. By the way, this is in the dry month of August 1974 when the sun was shining and everything was beautiful. At any rate, Dr. McMillan, who was the director of the Lab at that time, was out there, and he had all of these caterpillar tractors out to start pushing the earth away. And our consulting engineer, B.J. Leonard, called me aside. And I won't quote all the words he said, but he, in essence, told me they are crazy. They have got to stop. They are unloading it the wrong way. It is going to precipitate more. It had already broken the road. It had broken the underground utilities serving much of the Lab, and it had broken a building in two. It was a mess. And the Lab had retained -- I think it is O.C. Jones with a bunch of caterpillar tractors on the hillside. At any rate. I got that stopped because I noticed that the tractors were in violation of the OSHA roll-over protection. And finally the Lab apparently later retained Leonard himself who advised them on how to deal with it. Nonetheless, this was just an indication of further instability of that hill. And it was not precipitated by an earthquake. It was precipitated by underground water that is coming from higher up over in Tilden. And I came up with the idea of intercepting the water with a -- well, up by the Space Sciences Lab, and it worked but -- apparently I am running out of time. My recommendation to the Lab -- and I am supported, by the way. Dr. Curtis is a professor emeritus, and he can speak to the issue of geology far better than I can. His recommendation is to stop any further development of the Lab, pack up your bags and move elsewhere. Thank you.	tend back into the 1880's, LBNL records, and pre-development topographic maps, no historically active slides underlie or intersect the proposed GPL Building or the Building 85/85A facility. UC acknowledges that the dewatering efforts initiated by John Shively likely increased slope stability within a localized area; this observation underscores the potential for engineering projects at LBNL to have beneficial effects. Please see also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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PH-19	Good evening. My name is Janice Thomas. And I want to say hello to Susan Samson. Hi there. Because as an advocate of science, I really want to join with you in encouraging this laboratory to move in a direction that will expedite research and promote efficiencies. UCSF has four campuses. They collaborate, they are efficient, they are effective, and they grew out of that. And when they realized that they had expanded beyond the site's capacity with pressure from the community and listening to the University, they found a better site.	Issues related to the long term planning and development of LBNL at the LBNL main hill site are identified in the 2006 Long Range Development Plan (LRDP). Please see responses to Comments CMTW-18, BR-22, BR25, and BR-28. This comment does not address environmental issues or the adequacy of the DEIR, so no response is necessary.
PH-20	I applaud you guys with listening in respect to the general purpose lab. This room would have been packed to the rim had you all remained at that site. But I want you, over all, to continue to really, really hear. You can see that there are concerns. The more we learn about the geological conditions, the more we will be sharing with you all, and the burden upon you will be greater to respond to that. And that is why, again, it was reaching out to the science advocate because, again, the landslide that Mr. Shively talked about and the caldera that Dr. Curtis talked about are real phenomena.	The comment is noted. Please refer to Draft EIR Section 4.5, pages 4.5-9 through 4.5-25, for discussion and analysis of geological and slope stability issues pertaining to the proposed project. Please see also Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.
	The people who have institutional memory are you, Jeff Philliber. The decision-makers, honestly, they come and go. As one of the old-school people here I have seen a lot of movement of leadership, of course. But the decision-makers aren't here. And so we are going to have to somehow communicate loudly enough and effectively enough to get movement to find a better place to grow this campus. I know when 2025 comes around and this EIR comes out -- there will be a new one coming out -- I probably won't be participating in that one. But I keep thinking, is this the best place for the next hundred years of science? We are going to need science a hundred years from now, and we are investing in this place. So I just want you all to think about that. Thank you.	
PH-21	My name is Carl Friberg. And I speak on behalf of the steering committee for BLUE, Berkeleyans for a Liveable University Environment. I don't know where to start on this. Basically no, no, no, no. The City of Berkeley, you know, or the University costs the City of Berkeley approximately	The commenter states that UC Berkeley damages the City of Berkeley and expresses his dissatisfaction. The comment is noted, however this comment does not address the adequacy of the DEIR, therefore no response is necessary.

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	$14 million a year beyond what the University contributes, something like that. The last thing we need in this city, not only is it the idea itself, to have more trucks come across our roads, driving through our neighborhoods and, you know, tearing up our city. People of Berkeley, the residents pay federal taxes, we pay state taxes, we pay city taxes and now we have to pay for all of the damage you and the University does to our city. And now you want to ruin Strawberry Canyon more than it already is.	
PH-22	There is a lot of places that would welcome you with open arms, really, through the state, even nearby here. Your second alternative in your EIR would be perfect. Richmond needs the employment. It does not -- Berkeley does not. We are crowded.	The commenter states that Richmond would be a perfect site for future development and that the City of Richmond would welcome LBNL. The comment is noted. Chapter 5 of the Draft EIR, revised in Chapter 3 of the Final EIR, analyzes an alternative to the proposed project which would involve construction of the proposed GPL at the UC Richmond Field Station (RFS). Nevertheless, this comment does not address the adequacy of the DEIR, so no response is necessary.
PH-23	We can't park in our own neighborhoods on our block. Even though I have a permit, I have to drive around sometimes for 15 to 20 minutes to find a place to park. The streets are terrible. They are chewed up. We have construction all over the University right now. You are going to be building on a place where there is landslides. You have to tear down buildings to put up new buildings probably for more people to be driving through our streets. I thought you had some planners up there, people with intelligence. It doesn't seem that way. I mean, I am upset that I have to take time out of my family evening to come down here and even say anything to this. Disgraceful.	The commenter expresses dissatisfaction with neighborhood parking difficulties and with traffic congestion and roadway conditions in Berkeley, including impacts related to construction projects at the University of California. The commenter is also concerned about UC LBNL construction on a landslide-prone area. Regarding parking difficulties, the proposed project would not increase long-term operational traffic on Berkeley streets (please see Draft EIR Section 4.12). In addition, the Draft EIR addresses cumulative impacts from combined UC LBNL and UC Berkeley construction projects (please see Draft EIR pages 2-9 and 2-10). The LBNL 2006 Long Range Development Plan EIR examined truck-related impacts to city roadways for the combined LRDP construction and demolition program and found wear-and-tear to be less than significant (please see 2006 LRDP EIR pages IV.L-41 and 42) impacts related to UC construction projects in Berkeley. Regarding geologic conditions at LBNL, please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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		This comment does not address the adequacy of the DEIR, so no further response is necessary.
PH-24	My name is Leslie Emmington, and I live at 1955 The Uplands. And I am a member of Save Strawberry Canyon. And I wanted to respond to Dr. Gray because I know he is a gentleman undoubtedly of great integrity for his research -- your research, and you are excited about facilities that will make the research possible. And the kernel of your research is hope to bring health to problems we have in modern society. And Carl just mentioned the complexity or the questions of why this is the place. And there are so many themes here, but I think the main theme is the place and the health of the place and the instability of the place. And it's constricted. And you are hoping to have synergy and growth. And one discovery might lead to another discovery. And this is a place that didn't develop naturally. It developed because of World War II secret research. It is not a natural place to be. It is not a place where federal sustainability money should be used and applied. It is not part of the community. We understand this research is open to -- it is not secret. It is part of our greater community. And the millions and billions of dollars that are going into this research from federal stimulus money, perhaps, should be in a place like Richmond. There are so many things that have been said by people, but one thing I would like to emphasize again from today's New York Times is that that central feature of the front page was earthquakes. And we have been building buildings that are a threat to communities. They are in places they shouldn't be. There is earthquake faults running obviously, and this is just a place that is not healthy for LBNL as well as for the community. So let's all get together. We don't need a CAG because that is talking about some future. We need to talk about right now, the crisis of right now, joining together and finding an alternative site that gives an advantage to you	The comment is noted. Please see Draft EIR Section 4.5, pages 4.5-9 through 4.5-25, for discussion and analysis of risks related to seismicity, and Chapter 5, pages 5-1 through 5-36, for discussion of alternatives, including off-site alternatives.

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	and a community profile to you that enhances your image and your improvement and your research. So let's do it differently. Thanks.	
PH-25	Once again, you guys, maybe we should televise this and have, you know, a sit com for the public to know what citizens in Berkeley go through periodically trying to let the University and the Lab know how we feel about what they are doing. I happen to work at the Berkeley -- U.C. Berkeley's botanical garden when this happened, what Mr. Shively was talking about. Because there was so much water in those hills that during the worst drought we had had, the gardeners were embarrassed to be seen watering because they had so much water coming off the hill that they watered at night so nobody would see that they were using a huge amount of water in the garden. And that went on for a long time. That was a long drought. That water kept coming out. It didn't seem to have much affect on anybody's sensibilities up at the Lab. Oh, well. We will just let it come out. All that wonderful water we could have been using elsewhere except that now most of the water that comes down that hill is not clean enough to use. And you have to understand that whatever is up there is going to come down to the Bay and through our houses and gardens and streets. You have that nano-technology lab emitting nano-particles that you have no way of knowing the effect. What if there is an earthquake? What if there is a fire? You don't know what is going to happen. The Brits say if you inhale enough of it you suffocate. But you are just casual. Well, you know, science has to march on. And we are trying to keep up with it. It is so irresponsible. You need to get out of there. You need to clean up the mess that you have made. You can take down those buildings and clean it up and restore it. My field is horticulture and we fix creeks. You have got to restore those hills. You cannot keep damaging them, ruining them for anything else.	In the past several decades, the University of California and the Department of Energy have worked intensively to provide responsible stewardship of the LBNL main hill site and its environs. For example, over the past 20 years UC LBNL has worked under the regulatory oversight of the California Department of Toxic Substances Control to clean up areas of contaminated soil and groundwater at the site. UC LBNL will continue to evaluate potential contamination as new areas become accessible to investigation and clean up any newly discovered contamination to the levels required by the DTSC. The tritium groundwater plume is confined to the site with concentrations well below the drinking water standard and decreasing over time. No tritium has been detected in Strawberry Creek from the years of routine sampling by UC LBNL. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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	You have got that eucalyptus grove impregnated with tritium that you tried to sell to some Asian country until they got wise to it. I mean, what kind of people do things like that? You are pigs. You don't clean your place up. The stuff that's been going on up there is just crazy. You have got a lot of junk up there. You have got a lot of old stuff. Get rid of it all. Fix the hills. You have got that tritium plume coming down the Strawberry Creek. You have got to do something to clean up your mess. And unfortunately, although people have advised you to go to Richmond, God save them if you go to Richmond because you are such slobs. You really don't know how to take care of things. But you are going to do great science. I am sorry. I am not impressed. I want you to get out of the canyon. I want you to restore the hillside, clean up your mess and go. Do science, if you have to, somewhere else. If you don't, I mean, we lived for many millenniums without your science.	
PH-26	Good evening. My name is Pamela Sihvola with the Committee to Minimize Toxic Waste. For the past 15 years we have worked trying to understand and expose the historical contamination at the Lawrence Berkeley National Laboratory. In 1996, as Gene mentioned, we were desperately concerned about the construction of the replacement of the hazardous waste handling facility in a landslide area right on top of earthquake faults. Indeed, this is a map that shows the canyon. All these lines indicate fault lines. And the hazardous waste-handling facility is right here, right on top of the east canyon fault.	Please see response to Comment PH-13, above, in regard to siting, construction, and operation of the Hazardous Waste Handling Facility. It is not possible to specifically respond to the Commenter's references to maps shown to the audience in her oral presentation.
PH-27	And then the General Purpose Lab was proposed to be placed right on top of the fault. These areas marked with the green indicate the historic legacy contamination of the Lawrence Berkeley National Laboratory. The Building 25 site that has been mentioned as a replacement area for the General Purpose Lab is in a landslide area, as we all learned from the EIR. And it is right smack in the middle of the largest plume within the old town. The old town is right here. And I have some questions about the demolition of the Old Town as well.	Geotechnical studies have confirmed that the Building 25/25B site for the GPL is not in an active landslide area. The soil tests performed to date at the Building 25/25B site indicate that contamination is below actionable levels. After the floor slab is removed, additional tests will be performed. Please see Draft EIR Section 4.5, pages 4.5-9 through 4.5-15, for discussion of

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	There were five buildings in the notice of preparation for this particular EIR that were located in the Old Town, but suddenly they disappeared and went into a project called the demolition of the Old Town for which I understand nobody in the community knew anything about a negative declaration that was issued. So we are very concerned about what happened to those five buildings from the original plan and why, indeed, there was no environmental review for those particular documents.	faults, seismicity, and slope stability, and Section 4.7, pages 4.7-16 through 4.7-22, for discussion of subsurface contamination hazards that may be associated with the proposed Seismic Phase 2 Project. In regard to the question about the Old Town demolition environmental process, please refer to response to Comment PH-41.
PH-28	Building 55 is up here. It is also part of another plume that is associated with this section of the Lab.	The comment states that there is a plume of contamination associated with UC LBNL activities in the vicinity of Building 55; however, there is no known groundwater contamination underlying Building 55. Building 55 was not identified among the known locations of groundwater contamination at LBNL in the Second Quarter Fiscal Year 2009 Environmental Restoration Program Quarterly Progress report.
PH-29	And Building 71, all the trailers are in an area where contamination exists.	The comment states that all Building 71 trailers are located in an area where contamination exists. Pages 4.7-20 through 4.7-21 of the DEIR discuss soil and groundwater contamination in the vicinity of Building 71 trailers. While low concentrations of VOCs are present in the groundwater at that location, concentrations detected are well below MCLs for drinking water. Low concentrations of the halogenated VOC 1,2-dichloroethane (DCA) have been detected in the soil around the trailers; however, the maximum detected concentration is well below the Environmental Screening Level (ESL) that would be a concern for construction workers. Curium-244 was detected in soil in the trailer demolition area at a maximum concentration of 0.42 pCi/g, a level which is well below the current EPA Preliminary Remediation Goal (PRG) of 6.7 pCi/g for residential land use and 38 pCi/g for outdoor workers.
PH-30	In addition to the contamination, we have the earthquake fault. They are numerous and they all belong to the -- I mean, the whole Laboratory, the whole canyon belongs to the Hayward earthquake fault zone. And, indeed, I think initially all this should have been and may have been part of the (inaudible) zone which, indeed, has been modified at least 12 times since the past.	Regarding geologic conditions at LBNL, please refer to response to Comment PH-27 and Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site. Only a very small portion of LBNL is within the official State-designated Earthquake Fault Zone that surrounds the Hayward fault. Building 85/85A

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	The earthquake issue is a real concern. This map here shows the major slide areas. Again, we have faults, we have creeks, and then we have the slides. This is the big one which is the main reason why the -- well, the hazardous waste-handling facility is now supposed to be retrofitted. This map -- these buildings are from the Lab's 2006 long-range development plan EIR. Everything in black indicates proposed buildings. I don't know what, indeed, the Laboratory is planning to put, but this is a huge landslide area. Everything in black should never be materialized. I mean, it is sort of insane to even start retrofitting the hazardous waste-handling facility.	and the proposed General Purpose Lab are both located outside of the State-designated Earthquake Fault Zone (by distances of about 1300 feet and 4200 feet, respectively). Additionally, the map referenced herein by the commenter (she displayed this at the Public Hearing) includes hypothesized "paleolandslides" that have not been active in historic time and may not even exist, as mapped. Site-specific geologic and geotechnical investigations have recently been performed for the GPL and Building 85/85A for the specific purpose of assessing potential landslide-related hazards. Geologic investigations for the GPL demonstrate that the site is situated on a ridge of volcanic rock that has been stable for thousands of years. The project would be designed and constructed in accordance with the requirements of the California Building Code and UC Seismic Policy. Additionally, the recommendations of the expert geotechnical reports commissioned for the proposed project would be implemented. As such, seismic strengthening of Building 85/85A would appropriately restrain landslide deposits beneath the structures.
PH-31	I can't even imagine that the piers will be long enough. I mean, where are they going to be anchored?	The drilled piers for the Building 85/85A project will be anchored within in-place Orinda Formation sedimentary bedrock that exists beneath the landslide deposits.
PH-32	I mean, it is a huge slide, and I will bet you that -- I mean, I didn't see any real documentation that showed where there is stable ground where you can anchor anything.	The below-grade drilled pier and tiebacks will extend into stable in-place bedrock below the depth of previous landsliding and will be designed to retain deposits beneath the Building 85/85A facility. These deposits are smaller in size than the larger upcanyon-downcanyon slide that exists nearby but does not underlie the Building 85/85A facility. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site, and the Geologic and Geotechnical Investigation Report for Building 85/85A Stabilization prepared by Alan Kropp (April 2010).
PH-33	They should go out of the canyon. Here is the Old Town. Again, everything in brown indicates slide areas. And this is -- I mean, you look at all these proposed buildings. They are in treacherous areas, and if they are not located in a chemical or radioactive contamination site they are in a landslide area that is specifically defined by the state of California as being an	The question of developing further facilities offsite was considered in the EIR prepared for the UC LBNL Long Range Development Plan. Based on that EIR, the Regents decided not to adopt an offsite alternative for the long range development of the Lab. That decision of the Regents was upheld in *Jones v. Regents* (2010) 183 Cal.App.4th 818.

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	earthquake-induced landslide hazard zone which means landslide will be mobilized in the event of a major earthquake which we are expecting to happen any day now. So please take this matter very seriously, review the real dangers of these particular proposals and, indeed, very seriously consider off-loading these buildings from the hillside. Thank you.	With respect to the Seismic Phase II project, off-site alternatives to the proposed project, were evaluated in the Draft EIR at pages 5-1 through 5-36.]
PH-34	I would like to correct my previous comments to say that the Lab ignored the east canyon fault when it cited the hazardous waste handling facility on a fault. So I was indicating the hanky-pank that the Lab went through in order to build the replacement hazardous waste-handling facility, and that they decided after the original EIR to build a non-nuclear facility originally. They were to build a Category Three non-reactor nuclear facility. That was what the original EIR said. But the tritium focus group actually was able to get the Department of Energy to change the threshold for such a facility from 1,000 Curies to 16,600 Curies in order to make it possible for them to not build a nuclear facility. That is despite the fact that there was a huge inventory, about 39,000 Curies of tritium, at the Lab at that time. The other thing that they did was to move the fence-line a considerable distance from the existing fence-line around the hazardous waste-handing facility site in order to declare they are not exceeding the regulations for radiation doses to the public. This would not be possible without public hearings if private property rather than UC Regents property were located outside the existing fence-line. Carol was talking about what slobs the people are at the Lab. And I just want to point out that all of this is done under the tutelage of the University of California. And I see some parallels here to what has been happening with the stadium. The judge in the case of the stadium said, “You can't have this barrier” -- I don't know whether it is a pier or what you would call it --	Please see response to comment GB-2. For further discussion of issues pertaining to the commenter’s HWHF-related assertions on fence-line, piers, and nuclear status, please also refer to responses to comments GB-2, PH-31, and PH-32.

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	because it is attached to the stadium, and the (inaudible) will not allow it to be attached and to proceed. So someone just said we will do without this barrier that is supposed to prevent the stadium from collapsing in onto the recreation facility. So now we see all of this hanky-pank that took place in order to do the hazardous waste handling facility, changing the fence-line so it did not exceed the doses to the public, building a non-nuclear facility instead of a nuclear facility, and now 50-foot deep piers that are attached to the building. Shouldn't the Federal Government be looking at the (inaudible) requirements?	
PH-35	Yes. So each and every project that the Lab builds at the hillside campus increases our investment. And I say "our" since we are all taxpayers. It increases our investment in this mistake. So when I saw the presentation earlier and I saw these little shacks with these little buildings that were built in 1950 and they looked pretty bad, and I don't think they are really fit for anybody, especially the scientists and the research. So, yeah, demolish them. But you are, again, investing in the wrong site to be staying there. In other words, this should be the beginning of the end instead of more of the same and into the future. You said in your draft EIR that this new building, the general purpose lab, will allow some people to move from a leased off-site facility. I assume this is the Potter Street facility. Again, you have a nice facility with freeway access, and it is not all completely consolidated at one solitary site. No, it is not. But, again, I challenge you to think about we should not be transporting -- we should not be, again, investing in this new site -- not the new site. But we should be considering staying at the Potter Street rather than the hillside. When I see that you all are stabilizing the landslide area at the hazardous waste-handing facility, damn. I mean, this is a hazardous waste handling facility that was built on top of the east canyon fault. Is that what you said, Joan? I think I remember reading that in the draft EIR, you know, who did	The comment is noted. The Commenter's observations about the suitability of certain outdated small buildings and trailers and slated for demolition under the proposed Project is addressed by the Project Objectives (Draft EIR pp. 1-4 and 1-5). Please refer to Chapter 1 of the FEIR, which describes modifications to the proposed project. Whereas it was initially envisioned that approximately 100 future occupants of the proposed GPL would relocate to the LBNL main hill site from off-site locations, the proposed project has been modified so that future occupants of the GPL would be drawn primarily from on-site locations with only approximately 30 UC Berkeley researchers, some of whom already work or travel to LBNL regularly, transferring to the LBNL main hill site from the adjacent UC Berkeley campus. In 2008, extensive site specific geologic investigations were conducted in the area south of Building 85/85A to check whether the East Canyon Fault existed where previously mapped. Bedrock exposures viewed in exploratory trenches clearly demonstrated the East Canyon fault is not present and therefore does not underlie Building 85/85A. The Building 85/85A component of the Project relates to the singular issue of landsliding.

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	that. I don't like that. I don't think it was very good. I don't think it was very smart. So now, sure, you are going to stabilize it and you have to stabilize it. But doesn't this suggest that there is cumulative compound error, synergistic error? How about that one?	
PH-36	And I have got another one for you. If one cumulative impact wasn't analyzed -- and, Jeff, did you know about this, that 10,000 trees will be removed and 45 acres in Strawberry Canyon? It is a reasonably-foreseeable planned project. It is a FEMA grant. And there is no -- it is not listed as a project and therefore there is no cumulative impact analysis.	The comment states that the Strawberry Canyon Vegetation Management Project was omitted from the list of projects considered in the analysis of cumulative impacts undertaken in the DEIR. Please see response to Comment SSC-1-7. No further response is necessary.
PH-37	I just want to discuss the Hayward fault which extends from its contact with the San Andreas fault south of Gilroy and it goes on up and joins the Rogers Creek fault in Santa Rosa. Along this fault an interesting thing is happening. The serpentine is squeezing up like toothpaste carrying with it a lot of huge rocks. Stern Hall, the original Stern Hall and the extension of it sit on top of this melange, squeezed out of the Hayward fault. How fast it comes we don't know. But here is something we do know. When the tunnel was put in from the San Pablo Reservoir to the filter plan and to El Cerrito, three miles, when they got in over a thousand feet they bumped into serpentine at Thanksgiving. When they came back four days later that serpentine had squeezed out of the tunnel and they had to start all over. That stuff is synovial, and it carries with it these big rocks which are terribly dangerous, which, if it happens with this next quake here, Stern hall and Foothill housing will be destroyed. I also said that not because of the serpentine, but the earthquake itself is going to be as big as Loma Prieta, they say, or bigger. It will probably destroy the Richmond Bridge, which is very poor construction. Anyhow, if you want to see some of this, Tunnel Road has exposures of some of this material. And you can go along the Hayward fault as published by the U.S. Geological Survey and see this all along the fault material that has come up. Thank you.	The comment is noted; however, this comment does not address the adequacy of the DEIR, so no response is necessary.
PH-38	All right. Good evening, everybody. Can you hear me? Good. A few days ago there was an airplane flying very, very low, and I was very frightened.	Please refer to Master Response 2, Security Issues.

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	And I went out on Milvia between Cedar and Vine, I went down to look up at the Lab because I was afraid something might be going on with that airplane. Well, probably the reason why -- I think it was a fighter airplane. I don't think it was a private plane. Probably the reason why I reacted so much was because I was born in the middle of Stern Grove, World War II. And we had Nazi bombers. So whenever there is something like that, I go into kind of my war mode of being careful. So perhaps I preoccupy a little bit more about safety, but that was my experience. Now, some years ago I worked for a county supervisor in Alameda County, and I had a colleague in the Oakland Police Department, and together we worked on an evaluation plan for the Oakland Coliseum. And this was in the mid 1970s when there was a lot of information about a certain variety of terrorism in those days, which in your literature you call intentional destructive acts. Now, I usually don't say much about this because sometimes in the audience there are shaky people, and I don't want to up the ante. But I really think that this Lab is not very safe for the people that work there. I think the research is very important. I know people -- I have had people stay in my house who worked there, and I want to see it continue and to have more grants, but I would like it to be at an alternative site that has a safe perimeter. My policeman friend who died always said it was a law enforcement nightmare up there. How could law enforcement respond to intentional destructive acts. And I wonder if you do talk with our local law enforcement leaders, like what would they do. I know there is disaster planning, and it is kept under wraps, and I know Homeland Security is also at the Lab, but I would like to really have you	

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	think about that because most of you work there. And I know that whenever I hear an airplane like that one or an explosion in Berkeley, I usually think something probably went on at the Lab by a crazy person or a danger person. And because there is no buffer zone, I don't know how you can patrol it. Three gates with key-pads, it is very, very easy to penetrate the Lab. It would be very easy for someone to knock down those western power towers. There are many things there that -- I am not a law enforcement person, but perhaps you could you look more carefully at that and consider an alternative site like the Golden Gateway Project at the Army Base in Oakland or the Richmond Field Station. Thank you.	
PH-39	Excuse me. Thank you. I am John Shively. Again, I just want to say briefly, an earthquake is now due, and earthquakes seem to happen in great cycles. And Dr. Curtis can speak to that much better than I can. And when it happened, it is going to have consequences for the Lab absolutely. The Lab is built on a very steep, precarious hillside, and I don't know the geology, but certainly Professor Curtis does. And he has studied the full length of the Hayward fault. And he can give you a far better idea. But what I learned from Dr. Curtis is that when it does happen, certainly a lot of your facilities -- and the big investment that I know is up there because I worked up at the Lab back in the '60s for eight years except for two years I was in Switzerland. And then later I was working on the campus as a principal engineer in the Office of Architects and Engineers. I know the -- those facilities are going to be damaged or destroyed, and when that happens, not only will you have facilities destroyed, you are going to have life damage and injuries or people killed. And I don't see how, based on what I have learned from Professor Curtis, I don't see how you can avoid it. But it does bring us to the point, well, what are we going to do about it. Well, there are excellent alternatives, certainly.	The relative advantages and disadvantages of the RFS as the site for the Seismic Phase 2 project are discussed and analyzed on pages 5-18 through 5-25. The RFS is not located on a landfill and the DEIR contains no mention of the RFS being located on a landfill. The RFS occupies approximately 162 acres, of which 90 acres is upland, and 72 acres of Western Stege Marsh and mudflat. If the proposed project is located in the central upland portions of RFS, then liquefaction potential would be low; whereas the southerly portion of the RFS site (nearer the bay) has greater liquefaction potential. Please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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	The Richmond Field Station is, what, 20 minutes from the Lab. The campus is 10 minutes from the Lab. There is a bus that goes back and forth to the Field Station. The communication that is there is excellent. You got about 50 acres that can be developed. It is relatively flat. The LBNL report that alleges that it is on landfill is wrong. It is false. I know we did a soil study, and I know what is out at the Field Station because later I was a manager of the Field Station for six years. So I think that this is a time when you should -- I know it is not something that people can take lightly, and I know you have got a tremendous investment in there. And I know that it is -- there is going to be a lot a lot of resistance to moving, but when facilities and lives are put in jeopardy, then you must honor that. Thank you.	
PH-40	The date of Cal's February 22nd issue, "Berkeley Lab Reaps Benefits of Stimulus," this is -- this article states that, "Indeed, Lawrence Berkeley National Laboratory has received $264 million. Indeed, they have created 192 jobs." So if you calculate the basic value of each of these 192 jobs, it translates to $1.375 million per job. I mean, that is kind of interesting, and especially if we think about these other issues where taxpayer monies are spent on retrofitting folly, which is the hazardous waste-handling facility, and building on now known landslides, I think this laboratory warrants an investigation and full audit by the GAO. And I hope that everybody here will join, and I think that we should ask the government accounting office to investigate how these ARRA funds are being spent. Under these American and Recovery Reinvestment Act monies, they should all be used in a way that is fully acceptable to the impacted community.	The various components of the Seismic Phase 2 project described and analyzed in the Draft EIR would be supported by federal, non-ARRA funding. LBNL ARRA funding information can be found at: http://www.lbl.gov/Publications/recovery/index.html
PH-41	And then lastly I want to mention, I want to go back to the Old Town demolition, because this is very, very curious. On Page 4.0-6, you know, this is Chapter 6, Old Town demolition. And it says that, "The categorical exclusion was filed for the project under NEPA December of 2009. Based on	The Notice of Preparation (NOP) for the Seismic Phase 2 Project (December 9, 2008) was prepared in a relatively early stage of planning pursuant to CEQA Section 15083 (Early Public Consultation). The NOP repeatedly describes (e.g., on page 9, Project Information page; pages 11-12, Project Characteristics;

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	an environmental checklist completed in December 2009, this project was determined to be within the scope of LBNL's 2006 LRDP EIR.... The project was approved in December 2009. Work is expected to commence in mid 2010 and be completed in mid 2013." Who approved this project? Five of the buildings that were part of the original notice of preparation for this particular EIR are now dumped into the Old Town demolition without any public scrutiny, without any environmental review. I mean, were there any members of the public notified about the Old Town demolition? I certainly did not receive any notice regarding these categorical exclusions. I understand nobody here did either.	and pages 15 and 18, Demolition) the proposed Project as including demolition of Buildings 25, 25B, 55, modular trailers associated with Building 71, and Building 74F, with a stipulation that "in the event that Building 55 is not demolished due to funding constraints, one or more of the following seismically deficient buildings may be demolished: 4, 5, 14, 16, and/or 17." As project planning evolved during and after the scoping process, the funding necessary for Building 55 demolition became more secure and thus the option to possibly demolish the five Old Town buildings identified in the NOP was not carried forward as part of the proposed Project. The Old Town demolition project was later proposed when an opportunity arose to use federal funding to demolish a large portion of the LBNL "Old Town" area. It includes decontamination, demolition, and environmental restoration of Buildings 4, 5, 7, 7C, 14, 16, 25A, 40, 41, 44, 44A, 44B, 52, and 52A. NEPA for the Old Town project was covered under a Categorical Exclusion that was approved by the Department of Energy on September 28, 2009. CEQA was covered under the 2006 LRDP EIR, with findings and approval made on December 3, 2009 under delegated authority to the LBNL Director. Neither CEQA nor NEPA requires public notification of documentation and approval of these types, although a Notice of Determination was filed for the CEQA decision at that time. DOE and the University have made these NEPA and CEQA approval documents available to any member of the public who request them.
PH-42	So I think the GAO should look into how the laboratory is moving with these huge amounts of taxpayer money. They are moving really fast, as fast as the landslides when they start moving. And I think we need to stop it until there is full scrutiny about using the monies appropriately. Thank you.	The comment expresses an opinion of the commenter and does not address the adequacy of the EIR. No response is warranted.
PH-43	Just two small points. One of them is regarding Save Strawberry Canyon. I, as a citizen of Berkeley, was part of forming Save Strawberry Canyon, and Janice made a comment if the General Purpose Lab was still in Strawberry Canyon, this room would be full of people. And we mobilize around the beauty and the contribution that Strawberry Canyon makes to the greater	Regarding conditions at LBNL, please see Master Response 1, Geological Conditions Underlying the LBNL Main Hill Site.

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	Bay Area as part of its geological definition of what makes the National Seashore -- the consortium of all of our formations around the Bay. And we are also now talking about Blackberry Canyon and Old Town. And it is a newcomer for me. And tonight I am learning about Old Town and Blackberry Canyon. But what I want to share is that as someone who is like everyone in this town, probably, the Blackberry Canyon part of the Strawberry Canyon watershed is hidden to the eye. And even if you look at early pictures its ravine is hidden to the eye. It is part of the hill landscape, but it is hidden to the eye because the arroyo or the thickness of the steep slopes in which the Old Town exists were just thick with oak trees. And it is still not a vista point. You don't -- people don't quite know where that Old Town is, where the Bevatron, where the electrical power is coming through. And I learned about it in depositions for the CRT case that Save Strawberry Canyon had -- there is an electric city in there that is just like if you were out in the Russian Steppes or something and you went into one of these cities that is just pulsating with -- I don't know, but I am not sure that it goes together with cancer research. But anyway, the one other thing I want to say that is slides and the feeling of slides, I would like any of you to do what I did the other day during one of the rainstorms, which was to see the north fourth of Strawberry Creek, and if you find it where it comes down from Blackberry Canyon, you meet fences all around LBNL. And what is coming out from under the fences which are falling, tilting, old earth is coming down.	